

PUBLIC
TRANSPORT
PROGRESS

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"THE TIMES" OF THE TRANSPORT WORLD

GREAT
NORTHERN
WIDENING

See Page 3

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LONDON, MAY 30, 1959

PRICE NINEPENCE

Great Northern Line Widening

AT a luncheon presided over by Sir Reginald Wilson, chairman of the Eastern Area Board, to mark the formal opening by Sir Brian Robertson chairman of the British Transport Commission of the Great Northern Line widening between New Barnet and Potters Bar, Sir Brian referred to the long history of the project. It was, in fact, conceived by the Great Northern Railway Company which first obtained powers for the work in 1882. The opening out of the tunnels at Hadley Wood was deferred upon the adoption of the relief line scheme between Wood Green, Hertford and Stevenage. Sir Brian reminded his audience that no immediate financial return could be seen for the expenditure of nearly £3 million but they were proud of it as part of the modernisation of the Great Northern main line which included the £1 million Peterborough realignment, reconstruction at Grantham and, further north on the East Coast route, the four-tracking between Northallerton and Thirsk. In addition there would be resignalling and the introduction of the powerful Deltic diesel-electric locomotives. None of these schemes would be so useful without the widening which had now been brought into service. There still remained the bottleneck of the viaduct and tunnel at Welwyn, where, however, there were not so many trains and the signal engineer was devising special measures for increasing the throughput of trains. The terminal bottleneck at Kings Cross would have special attention later. Of the 35,000 passengers passing through the new tunnels every day, about half were commuters to whom the new regularity of service now possible should be of the greatest benefit. They were proud of the tunnels also because they were a showpiece for British engineering, illustrating the use of a new technique in tunnelling upon which he offered congratulations to the consultants, Sir William Halcrow and Partners and to the chief civil engineer of the Eastern Region, Mr. A. K. Terris. Without the new technique of a reinforced concrete lining, the work would have cost 40 per cent more in cast-iron; it would have been impossibly costly if carried out with brick lining as was the long tunnel through the London clay at Ponsbourne on the Hertford route—the last tunnel to be so built, over 40 years ago.

Too Much Transport?

ADDRESSING the annual conference of the Transport Salaried Staffs' Association at Hastings on Monday, the president, Mr. R. J. Gunter, suggested that Britain had too much transport. It would become efficient only when "stupid, inefficient competition," which ignored national economy, was removed. In 1953 the Conservative Government wiped out the principle of integration of transport. "Their passion for 19th-century doctrine has brought us to a state where the total financial disintegration of British Railways has been spoken of in the press. The blunt fact is that we have too much transport. The railways are too big and there are far too many vehicles on the roads. It is the economics of bedlam to have thousands and thousands of vehicles carrying on forward journeys and returning empty." It was fantasy to believe that every line, station, or but route which did not pay its way could be eliminated ruthlessly. Transport was a service, and if it was planned as a great national undertaking the paying section would more easily bear the less remunerative. It may be that transport over all is being used wastefully and without regard to the earning significance of its several parts; but would not the absence of competition breed worse results in cost and standard of service to the user?

Railway Vocational Training

OF all the changes now current on British Railways, none presents a more critical problem than the task of keeping the vocational training programme geared to the overall rate of modernisation. Everywhere the advent of new techniques demands suit-

ably skilled operatives, and since their training has to be achieved within the framework of existing commitments, the only practical solution is a gradual one, dealt with on a regional basis and in accordance with local requirements. To this end the Eastern Region has built at Ilford, on a site adjoining its staff hostel, a training school able to provide courses for 1,000 men annually. Instruction covers such diverse subjects as signal engineering, diesel locomotive and diesel train driving, rules and regulations governing train working, accounts, and booking office procedure, with a flexible curriculum for

Successful Convention in Italy

FORTUNATE, in the main, with the weather members of the Institution of Railway Signal Engineers returned last week from the summer convention in Northern Italy, on which they had been led by their new president, Mr. D. G. Shipp, supported by two vice-presidents and no fewer than eight past presidents. The programme was a full one but contained a judicious admixture of technical and non-technical occasions. The former included visits to the new relay interlocking signalbox at Treviglio, to the hydraulic box at Pioltello

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many other courses should they be required. The hostel which was built three years ago for the traffic department, can provide accommodation for 75 students, and is fully equipped with canteen facilities, and excellent recreation rooms, including a small workshop which will be used to help build a steam-operated passenger-carrying railway around the site. Both buildings were constructed on the Derwent prefabricated system, each having a quadrangular ground plan with single-storey units ranged round an open square in the centre. Courses range from two to 13 weeks, and the school has nine classrooms designed to provide tuition for up to 100 students at a time. The total cost of the building was £63,000 and the work was carried out under the general supervision of the architect and chief civil engineer of the Eastern Region.

Cruising in the East Midlands

YET another pleasure facility is offered by British Waterways this summer. Beginning on June 5 a five-day luxury cruise will be run at fortnightly intervals on Fridays from Nottingham until September 25 down the Trent to Yorksey, through the Fossdyke, an artificial waterway cut in Roman times, to the Witham Navigation, and terminating on the Lincolnshire coast at Boston. In the alternate fortnights, from June 12 to September 18, it will leave Boston on the reverse journey. The vessel for the service is *Water Wanderer*, converted in the Newark shops of British Waterways to provide sleeping berths for 16, toilet, shower and galley facilities and a saloon lounge which is used for some of the meals. Other meals—mainly breakfast and dinner—are served in first-class hotels near to the route. Participants enjoy an organised excursion from Newark to Southwell Minster but also have the opportunity of exploring Newark, Yorksey, Lincoln, Woodhall Spa and Boston on their own. There is an extensive open deck which will be popular in fine weather. A preliminary shake-down cruise convincingly demonstrated the delights of this form of holiday and the courteous efficiency of the crew. We are sure this is going to be a highly successful venture.

—this derivative of the Bianchi-Servetaz of 1886 was a novelty to most of the visitors—and a detailed study of the signalling equipment at Bologna where six main lines converge and there is remote control of the 11 surrounding junctions. The Fiat factory at Turin was visited and the party travelled at speed round the test track in the coaches conveying them. Apart from much what might be termed background hospitality such as arranging coach tours and a dinner in Turin on the last evening, the Compagnia Italiana Westinghouse organised a day on Lake Maggiore and at the Institution dinner in Milan Mr. Shipp emphasised the gratitude of all who had taken part in such a successful and enjoyable convention, not only to the company but also to the Italian State Railways which had been so generous in the facilities which it had provided.

Oil Wharves on the Thames

IN just over 60 years London and Thames Haven Oil Wharves, Limited, may have ceased to provide, as it did in 1898, the only oil terminal for petroleum spirit imported into London, but it has grown substantially in keeping with the demands of the industry which it serves. Two years after the formation of the company the first cargo of bulk motor spirit arrived in Britain and was discharged at Thames Haven where the facilities comprised 15 storage tanks with a capacity totalling 8,000 tons and one discharging jetty. By 1914 the capacity had grown to 75 tanks holding 300,000 tons and served by three jetties. The demands of the 1914-18 and 1939-45 wars had their effects upon the installation, hastening its growth and increasing its versatility and then, in 1948, an agreement was reached with the Shell Refining Co., Limited, for the storage of crude oil and finished products from the adjoining Shell Haven refinery. At that time Thames Haven covered some 300 acres and could accommodate 880,000 tons, while its annual throughput of refined products was just over a million tons, but the subsequent expansion and the modernising of existing equipment has brought capacity to 1,750,000 tons with seven deep-water jetties and six coaster and barge berths compared with four

jetties and three berths in 1949. In 1958 nearly six million tons were imported and refined products delivered totalled 4,200,000 tons. Apart from the handling of vessels and railway, 16 new stands have been provided for road tankers and a further 16 bays can be provided when circumstances call therefor. It is symptomatic of the changing requirements of the nation generally that the new vehicle stands should have been designed particularly to cater for the increasing demand for heavier grades of fuel oil. Three grades will be dealt with and deliveries will be made at a rate of 400 gal. per minute. It is expected that the new stands will come into use this month.

Wings on Display

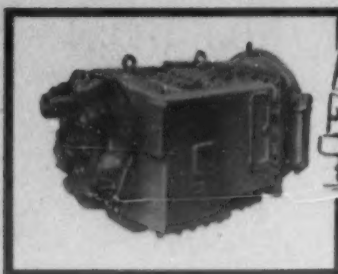
THE return last week of the Handley Page Herald from an 18,500-mile demonstration tour which took it to Pakistan, India and Ceylon as well as to Turkey and Iran marked the conclusion of the first major excursion by a British aircraft designed as a twin-engined successor to the veteran Douglas DC3. That it should have accomplished this with no other failure than a burst tyre is greatly to the credit of the builder of the machine, Handley Page (Reading) Limited, and of Rolls-Royce, Limited, even if the reliability of the Dart turboprop has come nowadays to be taken for granted. The aircraft was fitted with seats for 38 passengers, which was a somewhat less than tourist-class density, but it also gave some demonstrations of its capabilities in a supply-dropping role flying from Jorhat in North East India. Some of the dropping zones were not only small but were surrounded by mountains of up to 10,000 ft. and this certainly placed a premium upon the easy handling of the machine. It also provided some impressive examples of its ability to supplant the DC3, among them being an engine cut take-off from the airstrip at Leh which is 11,000 ft. above sea level and has at the end a 500-ft. hill surmounted by a monastery. It is too early to say whether the tour will be followed by orders for the Herald, but Sir Frederick Handley Page said firmly last week that a line of 25 was under construction and he did not believe in just throwing money away. The fact that it uses engines already well known to some two score operators of Viscounts must, of course, be a good selling point. Plans are in hand for a South American tour by the Herald and this may stir a traditionally slow market.

Top-Level Course in Handling

PROFITING by a most generous scholarship valued at £550 and awarded by the British Industrial Truck Association, one of Britain's materials handling executives, and a man well known in transport circles, is to go next month to the United States to participate in the annual materials handling course organised by James R. Bright at Lake Placid, New York. It commemorates the late Mr. John Morris, first president of the Association. The man is Mr. George Downie, executive officer in materials handling for Unilever, Limited, and he has been selected, basically on the strength of an original paper which he offered, supporting the theme that greater use of industrial trucks would benefit the British economy, from a considerable number of candidates. The Lake Placid course, the only one of its class in the world, is limited to executives in this sphere, and deals at an advanced level with the theory and practice of materials handling. By all accounts it is a pretty exhausting two weeks' experience in which the participant is expected to give as good as he gets. Mr. Downie is subsequently to tour a number of manufacturing plants and has promised "to sing for his supper" when he returns in the sense that he will lecture both manufacturers and students here on his experiences. Taking the narrow view, this seems an excellent way to secure both individual and corporate advancement from an industrial benefaction and his many friends in the transport and distribution sphere will learn with great pleasure of Mr. Downie's success.

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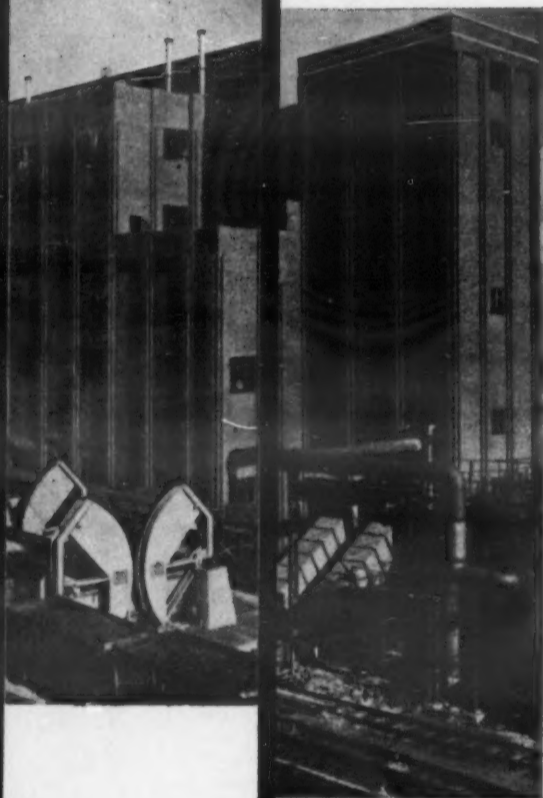
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Commercial Officer, Southern Region, Waterloo Station, London SE1 (Waterloo 5151)
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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements.

Public Transport Progress

It is always a good thing for transport managements to look back from time to time to see what has been done and to consider how far guidance for the future can be obtained from past events and also, as long as it is not carried out too frequently, to probe into existing practices and ask why they are so established and whether there is a better means of organisation. Congresses, and especially international congresses, can be invaluable for this purpose and for the cross-fertilisation of ideas. This week the International Union of Public Transport has been meeting in Paris under the presidency of Monsieur Charles Harmel and urban and other transport undertakings in Western Europe will owe a debt of gratitude to him and his management committee—and no less to the energetic secretariat under the direction of Monsieur André Jacobs—for a mass of information compiled and for the opportunities of discussing the papers presented by the reporters on various subjects from the work of public transport and the prospects of survival of light railways to details of improvement in motor bus construction.

Private Car Competition

ONE of the most important subjects dealt with is the very survival of public transport in Western Europe owing to the intensity of motor car competition. In a report by Messrs. O. Miescher, of Basle, and F. Lehner, of Hanover, they point out that public transport long ago lost its predominance; private transport not only robs it of traffic but, by creating congestion in city centres, makes operation more difficult. Its development will shake public transport to its economic foundations and will lead to serious consequences to the cities themselves, unless operators are able to make their facilities more attractive to enable them to compete effectively with car and moped. The authors suggest some self-help for a start, with a review of the means of transport, the networks provided, the modernisation of rolling stock and all-out measures to restore punctual and regular running. Rapid adjustment of service, efforts to encourage staggering of working hours, avoidance of time-wasting transfers from one vehicle to another where possible and the introduction of express services are other suggestions. Special touring facilities, park and ride arrangements, caution about fares increases and the fostering of good public relations are also advocated. It is further claimed that although transport undertakings cannot directly influence conditions it should be made plain to municipalities that public transport and its benefits to the citizens at large can be maintained efficiently only if it is restored to the front rank of consideration in all city activities and that its interests should be taken fully into account in all measures of a transport organisational nature; that town planners should take public transport fully into their confidence and that the agreement of the transport undertakings should be obtained to street layout proposals; the State should be prepared to assist in the problems which are beyond the transport operators and municipalities acting jointly. Only by measures of this sort, it is felt—and rightly—can the cities be saved from insufferable traffic congestion over long periods of the day.

Light Railway Survival

RAIL methods are playing a diminishing part in local transport affairs in certain countries. The light railway and the tramway have virtually disappeared from Britain; it is surprising to read some of the tabulations in the paper produced by Mr. H. J. Van Zuylen, the Rotterdam tramways manager, on the role of local railways and the

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replacement of rail by road transport. The Belgian Light Railways Company (S.N.C.V.) for example, ran in 1957 only 61 per cent of the railway car-mileage it worked in 1938; in less than 20 years the bus mileage multiplied by 14, and now exceeds the car-mileage generated on the railway side of the system. There are, in fact, 1,200 buses to 750 motor cars on the light railways. In France light railways have practically disappeared from the scene; there are still (1956) 2,308 km. of standard gauge minor railways compared with 2,890 km. in 1921, but the narrow gauge lines have suffered a slaughter, especially since 1932. The 16,278 km. of 1921 were reduced to 1,704 km. in 1956. Of 2,000 km. of electrically-operated light railway in 1921 only 250 km. remains; diesel traction preponderates on the surviving lines. The interurban motor bus route length is given officially as 16,885 km., with 29 km. of trolleybus route of an interurban nature. In Italy light railways have increased in importance since 1922, but bus route mileage has swollen tenfold, especially in suburban areas; with increases in wages and social welfare costs the best days of the light railway business are thought to have gone. The Netherlands light railways have almost all closed down, but in Germany and Switzerland great faith in the rail vehicle is retained. The German total of light railway passengers has gone up 1.66 times between 1938 and 1957; the increase in bus passengers is, however, from 7.7 millions to 132.2 millions and bus route-mileage of the undertakings in the Verband Deutscher Nichtbundes-eigenen Eisenbahnen E.V. has grown to seven times its prewar total. For a number of European light railway undertakings the author's proposal that it should form the basis of a regional transport undertaking may well prove acceptable.

Staggering of Working Hours

PROFOUND studies of working conditions with a view to easing transport peaks have been assembled by Monsieur Gayraud, general manager of the Lyon bus and tram undertaking, who began his paper with the 1958 conclusions of 36 French systems, members of the Union des Transports Publics Urbains et Régionaux (UTPUR). The sharp traffic peaks bring out large numbers of vehicles and crews for one or two effective journeys; traffic congestion is worsened with a drop in commercial speed and rise in the accident rate; the lowest fares are often applied to passengers whose transport costs the most, a flagrant anomaly; costs are thrown out of balance by the investment position as well as by the actual cost of transport. With many Continental concerns the midday peak is the one which governs the equipment provided, because of the physical and psychological difficulties of staggering the lunch hour. The conclusion is therefore formed that transport would be better served not only by encouragement of staggered hours but by the "continuous day," with a short lunch break taken at work or in close proximity to the workplace. This is virtually where we have arrived in Britain with the intensive development of canteen facilities at factories since 1939 and it is therefore of interest as showing the difficulties of those who compile reports from questionnaires in lieu of personal investigation that of seven British respondents only three admitted to the practice going on in their cities. This no doubt arises from the difference in the British and Continental conceptions of the lunch break.

Conditions in Cities

DIFFERENT conditions in cities are well illustrated in the paper by the proportions of off-peak to peak-hour vehicles—67 per cent in London, 49 in Brussels and in Paris, 44 in Hamburg, 42 in Glasgow, 35 in Manchester, 91 in Istanbul, 36 in Zurich and Vienna, 98 in Barcelona, 87 in Naples, 53 in Milan, 46 in Lyon, 60 in Lille and 75 per cent on the Lille-Roubaix-Tourcoing interurban undertaking, to quote some random examples. But despite quotations of lip service by Ministers to the cause of staggering of factory, office, shop, school and entertainment hours, it is realised that this is a long-term educational job, requiring much time and effort. As Monsieur Buron, the French Minister for Public Works, Transport and Tourism, has said: "Effective support must be obtained for measures which appear to correspond to the common good." If this causes the slightest inconvenience to any, the way to success is disproportionately harder. On another page we publish a summary of the paper by Messrs. E. R. L. Fitzpayne of Glasgow and W. M. Little of Edinburgh on trends in motor bus design; another paper on vehicles was that produced by Messrs. Fogliano and Paschetto of Turin on modernisation to reduce running costs, while Messrs. K. Blenkle of Berlin and P. Reynaert of Brussels compiled a useful study of new materials available to transport engineers for vehicle construction and maintenance, electrical gear and the overhead line (including nylon hangers for contact wires) which will be a source of reference for some time to come.

[Forthcoming Events appear on page 7]

WIDENING OF THE GREAT NORTHERN

Four Tracks Through Hadley Wood

OFFICIAL OPENING BY B.T.C. CHAIRMAN

OFFICIAL opening of the New Barnet—Potters Bar widening of the Great Northern Line of the Eastern Region of British Railways was marked on May 20 at Hadley Wood Station (now served by four tracks) by the unveiling of a commemorative plaque by Sir Brian Robertson, chairman of the British Transport Commission. The removal of

enjoy the fastest suburban service in the world. Hitchin, for example, will be within 30 minutes of Kings Cross and Knebworth, 25, at a frequency, in the peak, of an express train every 20 minutes. The first stage of the scheme, which included a new station with four tracks at Potters Bar, was completed in 1955. There then remained the work of driving three new twin-track tunnels, the widening of existing cuttings on the down side of



The south portals of Hadley North Tunnels

this 2½-mile two-track bottleneck from a stretch of multi-track main line running 21½ miles out from Kings Cross to Welwyn Viaduct has involved six years of work, removal of 750,000 tons of soil, the construction of three new double-track tunnels and the rebuilding of Hadley Wood and Potters Bar stations at a total cost of roundly £3 million.

This heralds a new prospect of faster and better services for users of Great Northern suburban line services to and from Kings Cross and the City.

the line, and the enlargement and modernisation of Hadley Wood Station. The work also involved the abolition of Greenwood signalbox and the installation of colour-light signalling and track-circuiting throughout. The three new tunnels were driven alongside the existing ones at Hadley South, Hadley North and Potters Bar and were 384, 232 and 1,214 yd. in length respectively. The tunnels were constructed upon a gradient of 1 in 200 rising towards Potters Bar.

The tunnels are driven through a ridge of London clay. No main line railway tunnels had

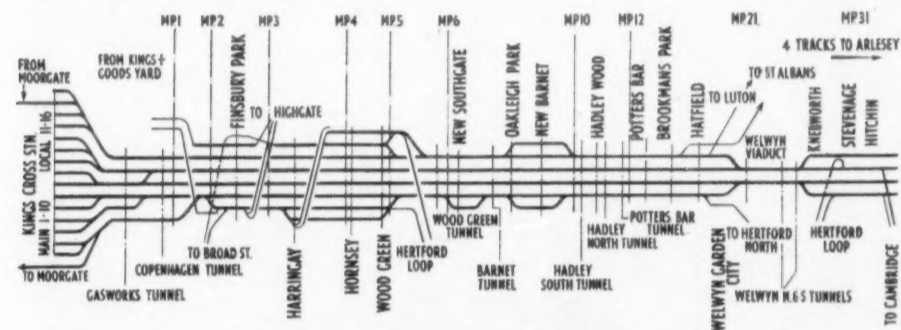


Diagram showing track availability from Kings Cross to Welwyn Viaduct following the opening of the tunnels

Commuters can look forward with confidence to having eventually a train service second to none; that to be introduced in the summer timetable on June 15 is the first step to this end. The new running lines and the almost complete substitution of diesel for suburban steam traction will make it possible to bring in an improved and generally faster pattern of service. In the evening peak, additional trains will leave Kings Cross for Hatfield and Welwyn Garden City, making their first stop at Potters Bar; there will also be a buffet car train from Kings Cross to Royston. There will be one

been constructed in Britain in such a geological formation since the two tunnels on the Hertford Loop, Ponsbourne and Mole Wood were driven just before the 1914-18 war. These were constructed by the traditional English method, lined with seven rings of brickwork, and involved the use of a large number of miners. In the intervening years economic and other conditions have changed and consideration had to be given to different techniques—suitable bricks were expensive and in short supply and bricklayers used to new tunnel work were scarce. Brick construction would,



Hadley Wood Station with the new and old tunnel portals in the background

extra morning train from Potters Bar and from Hitchin respectively. In the off peak there is to be a regular hourly service for the outer suburban stations and a service every half hour for most inner suburban stations.

Reduced Journey Times

There will also be, generally speaking a considerable reduction in journey times. In the Kings Cross—Hatfield section of the inner suburban service trains running fast between Finsbury Park and Oakleigh Park will alternate with those calling at all stations from Kings Cross to Hatfield. Later, when the plans for the electrification of the Great Northern Line have been approved and carried into effect, residents in these areas will

indeed, have been out of the question owing to cost. It was, therefore, decided that a concrete lining to the new tunnels would be the most suitable and economical.

The design of tunnels decided upon was put forward by Mr. H. D. Morgan, the senior partner of Sir William Halcrow and Partners, who were the consulting engineers for the work. Apart from consultation on the detailed design of the tunnels and the appropriate parts of the contract document, all the drawings and the design of the scheme as a whole, including the preparation of most of the contract document, was undertaken at Kings Cross in the office of the chief civil engineer, Eastern Region, Mr. A. K. Terris.

(Continued on page 10)

Another FIRST for SKF

The first ten 1,160 h.p. Type 2 Bo-Bo diesel electric locomotives built at the Derby Works of British Railways are equipped with SKF self-aligning spherical roller bearing axleboxes. Further large orders have been received covering axleboxes for similar locomotives to be built at Derby, Darlington and Crewe. Under British Railways' Modernisation Plan, SKF axleboxes are being used in increasing numbers on locomotives and rolling stock of all types. Their advanced design, the result of experience gained from the supply of well over one million axleboxes to the railways of the world, ensures that every SKF axlebox will give maximum performance with an absolute minimum of maintenance.



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The locomotives are being equipped with BTH mercury-arc rectifiers and associated transformers, traction motors, and the latest type of camshaft tap-changing control. BTH are also working on another British Transport Commission order for thirty-five sets of a.c. electric equipment for multiple-unit stock, incorporating germanium rectifiers. This is the first bulk order of its kind in the world.



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Abnormal Loads Can Go on Motorways

ALTHOUGH the experience of the Preston by-pass motorway has not been extensive, the Minister of Transport has decided that abnormal indivisible loads up to 14 ft. in width may safely be permitted, without special restrictions, on all future motorways. It will be recalled that the Preston By-pass was opened on an experimental basis to abnormal indivisible loads in alternate months. The Minister proposes that in the new Special Roads (Classes of Traffic) Order vehicles carrying abnormal indivisible loads and tractors being used in connection with them will be permitted traffic without restriction by classification. The Motor Vehicles (Authorisation of Special Types) General Order, 1955, will be amended so that the existing over-riding limit in article 14(g) of 20 ft. on the overall width of any load with its carrying vehicle will be supplemented by a further provision that, on a special road the use of which is confined to vehicles of classes I and II, the width of load plus vehicle shall not exceed 14 ft. The net effect of this proposal will be that:

(a) abnormal loads over 14 ft. wide will only be able to use a motorway if and as authorised by individual Order under section 3 of the Road Traffic Act, 1930;

(b) loads not exceeding 14 ft. wide will be permitted to travel on motorways without prior permission but subject to the giving of notices to the highway authorities and police authorities as prescribed in the General Order and subject to the power of the police to direct variations in the time, date or route in such cases.

The Motor Vehicles (Speed Limit on Special Roads Regulations, the effect of which was that no speed limit is imposed on any vehicle driven on a motorway, except that where a trailer with less than four wheels (or with four close-coupled wheels) and not being an articulated vehicle is being drawn a speed limit of 40 m.p.h. must be observed, will not be altered. As a corollary to the above, from August 1 next the special powers given to the Chief Constable of Lancashire to authorise the use of motorways by vehicles carrying abnormal indivisible loads and by locomotives used in connection with them will be withdrawn.

Case Against C-Licences Not Made Out

REFERRING to a recent published statement by Mr. Ernest Davies, M.P., that under a Labour Government it will be necessary to restrict C-licences "in one way or another," Mr. F. D. Fitz-Gerald, secretary of the T.R.T.A., comments: "It is certain that the average member of the general public would find it difficult to understand why the trades and industries of this country should not be free to run their own vehicles without restriction. After all, no one is suggesting that the private motorist should be compelled in certain circumstances to abandon his car and use public transport instead. The threat of restriction on the operation of C-licensed vehicles has been made perfectly clear. What has not been made clear is how implementation of the threat, if it were found to be possible, could benefit the country. It would clearly be detrimental to the interests of manufacturers and traders, who only incur the very heavy investment involved in providing their own transport if they are satisfied that it is the most efficient way of serving their customers. How far

it would benefit the railways is a moot point, but it would not outweigh the aggregate loss to trade and industry. If the railway can offer service, traders will be happy to transfer their traffic—voluntarily."

Addressing the London branch of the National Union of Manufacturers on Tuesday, the chairman of the British Transport Commission, Sir Brian

loads to the Continent." Thirteen objections are listed to this application, the first of its kind to reach the public inquiry stage. They include British Railways and B.R.S.

Whitsun Congestion Exaggerated

THERE is some annoyance at Victoria coach station, headquarters of London Coastal Coaches, Limited, caused by a spate of announcements in the press and statements on the B.B.C. and I.T.V. over the Whitsun holiday, which created, it is said, the impression of serious road congestion and extensive delays. This was a serious exaggeration of road delays, says Mr. F. W. J. Robinson, general manager of London

that the concession of overloading buses by 25 per cent would be withdrawn in three months, the concession of reporting Transport Board drivers to the board without prosecuting them will be withdrawn immediately. The police said that vehicles should not be put on the roads unless they were certified as roadworthy. The number of buses involved in accidents had shot up from 1,853 in 1955 to 2,883 last year (it is not stated whether the figures are comparable). Forty-seven persons were killed in bus accidents last year and 901 injured.

Is the Bus Problem Really Appreciated?

AFTER the "truly surprising response" in the 1958 Budget to the pleas of the bus industry for a lightening of the burden of fuel tax—instead the rate of profits tax was increased from 3 per cent to 10 per cent—the 1959 Budget did at least produce some relief in respect of road fund licences, said Mr. J. S. Willis, presiding at the annual general meeting of the Birmingham and Midland Motor Omnibus Co., Limited, on Tuesday, this week. For B.M.M.O., he added, it reduced this particular form of taxation to the extent of approximately £90,000 per annum—substantially equal to the extra burden of profits tax imposed in the previous year. While the relief was very welcome, it is a small sum when compared with fuel tax, which costs them £800,000. He wondered more and more whether the Government was really serious in its concern, so frequently expressed, about the maintenance of rural services.

Apart from relief from taxation, the industry would be helped by the abolition of the speed limit for public service vehicles outside built-up areas. The Minister had already said that he favoured increasing the present limit of 30 m.p.h. to one of 40 m.p.h. But there would appear to be no logical reason why, in this regard, public service vehicles should not be in the same position as private cars. The p.s.v. was driven by a skilled driver who could be trusted, surely at least as much as a private motorist, not to drive faster than circumstances safely permitted. And he had to consider the comfort of his passengers as well as their safety.

To meet changing conditions there had been progressive cuts in some services where the frequency was no longer justified by the traffic. So far they amounted to little more than 5 per cent of the total mileage operated. At the same time, operation had increased on a number of routes where, because of developments of one kind and another, the existing services proved to be inadequate. Of all services 64 per cent, and 32 per cent of mileage, produced revenue which was less than overall costs, much of this type of operation being in the rural areas. Mr. Willis referred to the impending London—Birmingham motorway coach service and said modified coaches were now being prepared (as an interim measure), also that prototypes of the new high capacity double-decker, with alternative front entrance and separate entrance and exit, were under construction.

Bus and Coach Development

A. E. Scull and Sons, Westbury, applies for the licences of Millard and Huntley, Dilton Marsh.

C. G. Martin and K. E. Hine (trading as Lovegrove and Lovegrove), Tadley, seek the licences of Lovegrove and Lovegrove, Limited, Silchester.

Crosby Motor Services, Limited, proposes express services between Valley Airport (Anglesey) and Birmingham and London and Valley and Wolverhampton, Birmingham and Coventry. They would carry only passengers through-booked passengers to and from Dublin via Valley in conjunction with Aer Lingus.



Latest additions to the Bradford City Transport fleet are a batch of A.E.C. Regent Mk. V 31-ft. long buses with front-entrance 70-seat bodies

Robertson gave it as his opinion that "if the growth in C-licensed vehicles continues at the present rate it will in the end virtually eliminate public transport, public road transport first." Among the producers of consumer goods, who had become very road minded, the railways had virtually lost the wagonload business. But the railways were giving a demonstrably better service than for a long time. Selling traffic was no longer just the responsibility of a subordinate townsman. Those right at the top were ready to talk about a customer's business. "We shall get your business, not all of it, but a lot of it, sooner or later," he ended triumphantly.

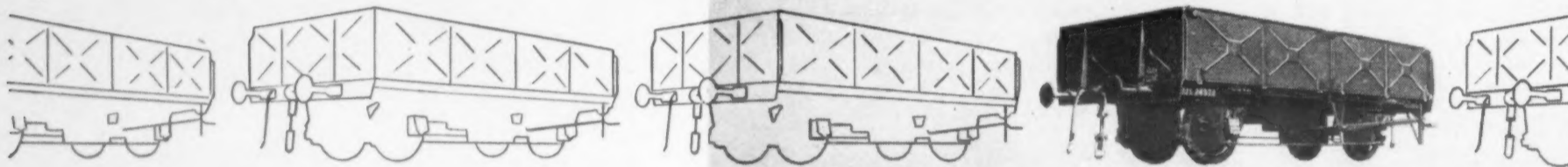
Dutch Applicant for A-Licence

ON June 11 the Metropolitan Licensing Authority is due to hear an application by A. Gemmink and Z. of The Hague in the Netherlands, for one vehicle and trailer, the normal user of the A-licence to be "all goods, especially perishable goods carried in applicant's vehicles from the Continent via Antwerp-Tilbury ferry, for delivery in England within 200 miles radius of Tilbury, and return

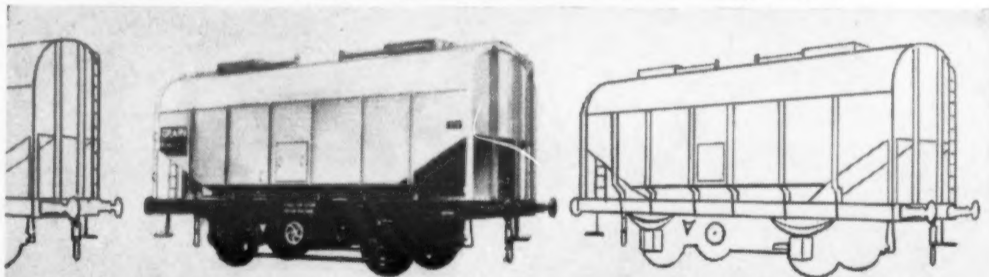
Coastal Coaches. During Whitsun, he adds, there were over 7,000 coaches in and out of Victoria coach station; with very minor exceptions all left on time and the worst delays in arrivals were not more than 40 min. late. At the coach station on Whit Monday evening most coach arrivals completed their journeys within 15 min. of scheduled times; indeed some arrived early, the long-distance services being generally more punctual than short distance. Information obtained from other main coaching centres, such as Cheltenham and Birmingham, indicate that their experiences were much the same—coaches running well to time and no delays of any consequence. What disturbs London Coastal is the fear that some people who would otherwise have enjoyed a coach trip during the holiday had been persuaded to stay at home.

Police Take Dim View of Ceylon Buses

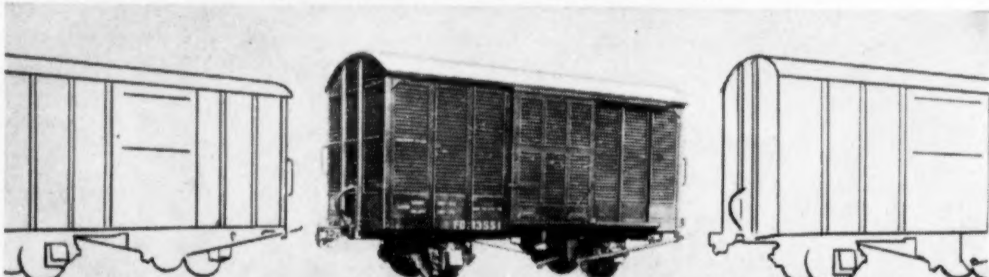
MOST of the buses of the Ceylon Transport Board are unroadworthy, and the general standard of driving by the board's employees is deplorable. So said police officials at a conference with Transport Board officials. The police said



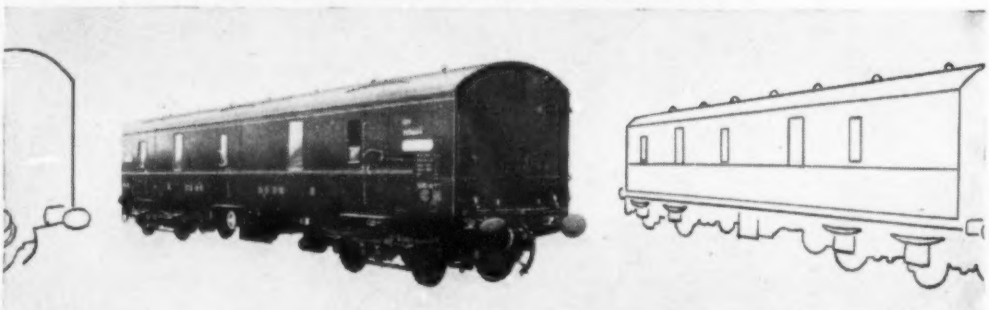
The F.J.S. Low-sided Wagon, as supplied to Queensland Government Railways, Australia.



The 20-ton Bulk Grain Van, used by British Railways.



The F.D. Louvre Van, used by Western Australian Railways.



British Railways 57-foot Utility Van.

A capacity of
1,400,000 tons

THE CARRYING CAPACITY of the rolling stock produced by Pressed Steel in the past eight years adds up to 1,400,000 tons. This figure is made up of carriages and wagons of all types, for all gauges, at home and overseas. You see some of this rolling stock here.

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Manufacturers also of motor car bodies,
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pressings of all kinds.

A HOME COUNTIES HAULAGE BUSINESS

Built Around Special A-Licences

SEMI-TRAILERS TO MEET MANY REQUIREMENTS

FIVE years have elapsed since the selling back to private enterprise of a sizeable chunk of the British Road Services fleet began. Five years is a long span in the annals of this troubled industry; it is characteristic of its fate that as the first special A-licences go through the licensing authorities' offices for renewal, and the holders are asked to justify the conditions of user which are sought, there should be hanging overhead the

particularly spectacular, is typical of that performed in the round by thousands of haulage vehicles and which could not satisfactorily or indeed readily be carried out by another mode of transport. Probably the greatest help in building up this broadly-based business has been the employment of a traffic manager (Mr. A. Hartley) who has had experience in a large forwarding agency, in this case Davies, Turner and Co., Limited.

There are six A.E.C. articulated units, four Mercury and two Mandator tractors, the latter with the 11.3-litre 150-b.h.p. engine, two of the new Dodge forward-control tractors with Leyland Q350 engines, one Thames Trader articulated vehicle and a Leyland early-type Comet. The six rigid vehicles are 5-6 ton Thames and Dodge units. Mr. Hope acquired the two Mandator 150-b.h.p. tractor units (a third is to follow) because he considered that the additional power, with suitable transmission ratios, produces the combination of speed and slogging power which his vehicles require on their multifarious duties, and similarly with the Leyland-engined Dodges, which have two-speed rear axles.

The A.E.C. 11.3-litre engine returns 8.9 m.p.g., the smaller 7.7-litre 112-b.h.p. engine in the Mercury tractors 12.14 m.p.g. Mr. Hope is delighted with both versions, as he is with the service he gets from the Southall service station. The first Mercury has now run some 210,000 miles in four years with only minor attention.

Semi-Trailer Points

Smallest of the semi-trailers are semi-low-loading units of 8-8 ton capacity, ideal for carrying light but bulky materials. At the other end of the range there are Dyson and Scammell 25-ton low loaders, Dyson tandem axled and four-in-line 16-17 ton platform units and York single and



A.E.C. Mandator 150-b.h.p. tractor of Hope Transport, with Dyson semi-trailer carrying a 19-RB excavator

threat of renationalisation with all the doubts and speculation which it brings in its train.

Mr. F. J. Hope, who, as F. J. Hope Transport, is at present operating 16 vehicles on general and long-distance haulage from a base at Bedfont, Middlesex, just across the Great South West Road from the back door of London Airport, is a new-generation haulier, that is to say, he came into general haulage in earnest only through the purchase of B.R.S. vehicles. Before that he had been an operator of tipping vehicles. To him, therefore, this was an adventure into the unknown.

To old hands in the haulage business who remembered conditions before 1948 the spectacle of newcomers prepared to sink money (however little) seemed at that time foolhardy in the extreme. Perhaps they underrated the philosophy of men like Mr. Hope, who says that while no more patriotic than the next man, he gets a great deal of satisfaction out of a transport job well done and likes to feel that he is doing his bit in the development of industry. He freely admits that he has "edged his way in," but South-West Middlesex, which in the past decade or so has been the scene of expanding industry, mostly of a light character, much new factory building and several contractors' equipment depots, offered scope for more road transport.

Service to Contracting Industries

In the circumstances it is not surprising that the business has concentrated on serving the building and civil engineering industries. But the key to success has really been diversification so that when trade was momentarily slack in one direction vehicles could be diverted to general haulage. A powerful weapon has been reliance on articulated vehicles. Of the 16 vehicles operated from Bedfont, 10 are articulated and a large number of semi-trailers has been acquired, some flat platform or dropsided, others low-loaders of various classes and capacities from six to 25 tons. With these it is possible to meet the demands of any class of customer at any time. One old tractor is operated as a "slave" to the rest of the group and is used to get loads "on wheels" pending the return of a long-distance unit.

The aim is primarily to serve customers who have large or bulky loads moved anywhere, and in a hurry. Steelwork, precast concrete sections, portable contractors' buildings and spares for ship-



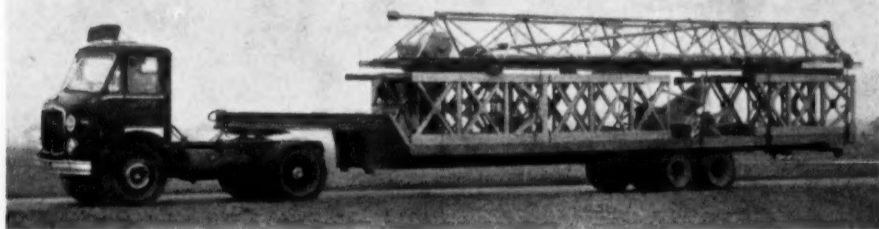
A Thames Trader Dyson articulated low-loader used for contractors' plant

tandem axled semi-trailers, also platform or sided units. A certain number of secondhand heavy machinery trailers of transatlantic origin is included in the fleet; the latest is a front-end loading type with hydraulically-operated front swan neck.

Mr. Hope is very pleased with his York semi-trailers. Points he likes about them are: pressed steel frames, lighter and more flexible, therefore less liable to fractures; location of axles by means of radius rods, with no-shackle springs—this gives true tracking under load, and longer tyre life, fewer spring failures; the unusually large braking area (about 360 sq. in.); the ease with which brakes can be taken up—the slack adjuster can be set to fine limits. Owing to the wide variety of terrain



Above, another A.E.C. Mandator 150-b.h.p. unit, this time with six-speed gearbox incorporating overdrive, and coupled to a York semi-trailer; below an A.E.C. Mercury hauling parts of a tower crane on a 45-ft. long trailer, well section 35 ft. long



ment figure prominently in work done; excavators, contractors' plant, timber sections and reinforcing rods are other loads frequently carried for the building and contracting trades. General haulage covers a multitude of loads, ranging through imported produce and canned goods, potatoes, bales of rubber, leather and castings to tiles, wax and polish. The turnover has risen from £6,500 in the year 1950 to £57,500 last year and the aim is at least to double this.

Selling Point

This catalogue serves to show that Mr. Hope has not got all his eggs in one basket and indicates that fully 50 per cent of his work is in the specialised category of heavy or bulky consignments for which the door-to-door facility of road transport is imperative. His vehicles travel the length and breadth of Britain and their task, if not

over which the vehicles operate and the consequent variations in liner wear this last point is of considerable practical importance.

In an entirely different sphere is the business of J. Steele (Datchet), Limited, which was acquired recently. This is a livestock and horsebox operation, for which a half-dozen or so vehicles are regularly employed, the balance being on general haulage. In addition to serving the Royal household at Windsor, the business carries for numerous other farmers and landholders in the Berkshire countryside, and the accounts ledger reads rather like pages from Debut. Few haulage businesses, one imagines, need Kelly's Handbook to the Titled, Landed and Official Classes as a vade-mecum in the accounts department. At Datchet, one hastens to add, it is required to ensure that the correct form of address is accorded the distinguished customers, not that their credentials are in doubt.

A.E.C. "MAMMOTH MAJORS" CLOCK 1,000,000 MILES

Outstanding record
prompts London Brick Company Limited
to order 54 more A.E.C.'s

To London Brick Company Limited, a million miles service from an A.E.C. is almost commonplace! Over many years three A.E.C. "Mammoth Major" 8-wheelers had recorded well over 1,000,000 miles each at the end of 1958, and several others were coming up to the 900,000 mile mark. And these are no exception, for only

last year London Brick disposed of 50 old type A.E.C. 4-wheelers—each of which had achieved the remarkable record of $\frac{1}{2}$ million miles!

Here is positive evidence of the extra long life which has always been claimed for A.E.C.'s, evidence of sound design, robust build and first class maintenance by the operator. After operating A.E.C.'s since 1935 it is not surprising that the world's largest brickmakers have now ordered another 54 Southall-built vehicles.



7,250 bricks can be transported in one load by this "Mammoth Major" 8 in the A.E.C. fleet of London Brick Company Limited. Vehicle and load come to 23 tons 19 cwt.



A.C.V. SALES LTD · A.E.C. WORKS · SOUTHALL · MIDDLESEX

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Photograph by courtesy of Drew Bros. (Frampton Cotterell) Ltd.

Are you sure you carry meat ALONE?



There is no place for germs in this insulated meat transporter, thanks to its design and the material used to build it. The floor, with its radiused sides, eliminates the "blood trap" frequently found in other types of construction, which provides a fertile breeding ground for flies. And Birmabright aluminium alloy, completely non-absorbent and easy to keep clean, cannot harbour bacteria.

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MANUFACTURER AND AGENTS CONFER

C.A.V. Meeting at Harrogate

TRADITIONALLY, the gathering arranged by C.A.V., Limited, recently at Harrogate of the company's agents and customers in the northern areas was an instructive and extremely pleasant occasion, the result of efficient but unobtrusive organisation and a nicety of blending of business and social sessions. Also in keeping with similar events held annually in different parts of the country, the business sessions provided opportunity for C.A.V. staff to appraise those attending of the latest developments in its fuel-injection and electrical equipment and for frank discussion of mutual problems. The seal of complete enjoyment of the occasion was set by the Mayor of Harrogate, Councillor Bernard H. Wood, in a neatly phrased address of welcome to Mr. H. G. Mason, C.A.V. director and joint general manager, and the conference.

Among recent developments discussed were the distributor-type DPA fuel-injection pump, alternating-current electrical equipment for vehicles and the new four-headlamp system and examples of components of these types were freely available for examination and demonstration. The gathering momentum of railway dieselisation was reflected in the greater number of British Railways staff attending the conference and in Northern Forum—a session in which C.A.V. engineers led by Mr. H. P. Astbury, director of sales engineering, answered questions from delegates—several related to electrical equipment fitted to railway diesels. British Railways reciprocated by making available nearby the powerful English Electric Deltic locomotive for inspection by delegates, many of whom took advantage of the opportunity of examining an example of diesel engineering on a grander scale than in road transport applications. A highlight of the conference was the delivery by Mr. W. E. W. Nicolls, C.A.V. chief development

engineer, of a paper on recent advances in fuel-injection engineering which led to the achievement of the C.A.V. DPA distributor-type pump (described in MODERN TRANSPORT of December 6 and 13, 1958). Mr. Nicolls's masterly exposition, which was supported by an excellent instructional film on the DPA pump, made clearer to many in his audience not only the several technical advantages of the new equipment over the more expensive in-line jerk pump but the magnitude of the problems that had to be overcome to bring the DPA pump to its present state of efficiency.

The speaker said that in the early stages of examination of the DPA design there appeared to be certain fundamental differences that contravened some of the assumed requirements of a fuel-injection pump, namely control of the end of injection; the omission of an unloading delivery valve; different characteristics of part-load timing; and provision of excess fuel for cold starting. These points had been the first on which the company had sought to satisfy itself when the design first came under consideration some seven years ago.

End of Injection

Regarding end of injection, whereas in the conventional jerk pump delivery is terminated by the opening of a spill port by the plunger helix, the DPA pump continues to discharge until the plungers actually come to rest at the end of their stroke. Because there are obvious limitations to the rapidity with which a moving plunger can be brought to rest, it might be thought that this more gradual ending of delivery would be inferior to the sharp cut-off given by the helix controlled pump and so give rise to dribble at the nozzle.

Service experience failed to reveal any evidence whatsoever of any increased tendency to nozzle

trouble due to dribble and it is now known from mathematical analysis of the two systems, and from oscillograph records of pressure and needle lift in many applications, that there is in fact no significant difference between the two systems in this respect. This is mainly because of the influence of the nozzle and the high pipe pressure, and the fact that even in the helix-controlled pump, wire drawing at the port and fuel inertia limit the rate at which delivery can fall off.

Unloading and Part-load Timing

Considerable importance had always been attached in the past to the unloading type of delivery valve to control the residual pressure in the pipeline after injection and prevent secondary injections. In the case of the helix-controlled jerk pump, there is no doubt that it is important. The DPA pump has no separate delivery valve and unloading is effected by a step on the cam. What must be remembered is that the DPA pump does in fact have a delivery valve—namely the rotor, which seals off the line at the end of the injection. The combination of this with the so-called retraction ramp on the cam provides just as good control of residual line pressure as the delivery valve in the in-line pump and secondary injections are no more of a problem than in any conventional injection system.

In most conventional injection pumps, delivery always begins at the same point on the cam, irrespective of delivery quantity; in the DPA pump it is the end of injection which is constant and the beginning gets later as the delivery is reduced. This is not necessarily a disadvantage and some in-line pumps are deliberately provided with such a characteristic by means of the so-called inverted-helix element. One consequence of this characteristic is to reduce combustion noise at light load, this effect being most beneficial at idling where it is reflected in both a quieter and smoother running engine.

For the majority of engines, particularly those with direct injection, part-load performance is not critical to injection timing. However, in the case of some very small high-speed engines with indirect injection, this inverted-helix characteristic can give rise to a tendency to misfire at light load at maximum speed, which cannot be entirely eliminated by providing speed advance alone since advance of timing by an amount sufficient to

suppress misfire results in over-advance of full load timing and consequent excessive combustion noise. For such cases it is possible very simply to advance the cam of the DPA pump automatically with reduction of load to offset the normal retard characteristic; this effect can be used either by itself or combined with speed advance, according to the requirements of the engine.

Excess Fuel

The maximum fuel adjustment of the DPA pump is inside the pump casing on the rotating assembly and thus cannot be tampered with during operation. Because of this it is commonly supposed that it is not possible with this pump to provide excess fuel for starting. Excess fuel, up to about 50 per cent of the normal full load delivery, can in fact be readily provided by temporarily preventing the retraction action which normally takes place at the end of the injection. In this way the amount of unloading is added to the net delivery from the pump. This can be very simply effected by retarding the position of the cam, so that the delivery port is cut off before the plungers have had time to follow the cam down to the retraction ramp. By so doing, the injection timing is also retarded and this also can have a beneficial effect on starting.

In Northern Forum, a question on the relative efficiencies of cloth and paper filters elicited the reply that while it was true that for a given length of cloth the interstices were more uniform than those in paper, they varied from length to length and were in any case too large for the degree of filtration considered necessary for fuel-injection equipment. Two major factors in design were adequate protection of precision parts and adequate service life. Using particles of a nominal size of 12½ microns, the transmission of the old C.A.V. cloth filters was as high as 85 per cent whereas the C.A.V. paper filter allowed to pass only 7 per cent. This great reduction in transmission was a measure of wear reduction and was stable throughout the designed service life, which was an ability to pass 1,500 gal. of fuel before choking occurred.

A.C. Generators

Replies to questions on a.c. generators capable of being driven at reasonable speeds, which were said to be available on the Continent, indicated that a lot of work had been put into this development both for road and railway use. An 8-in. 24-volt machine was now in production for British Railways and samples of a smaller alternator for road passenger vehicles were on test. Both machines would be available in ventilated and totally enclosed form. In trying to achieve the greatest possible output consistent with minimum weight, first thoughts were based on a machine driven at about four times engine speed. It was realised that this would present difficulties in obtaining the drive but thought that advantages to be gained justified the development. Events proved the drive problem was greater than anticipated and C.A.V. had now revised the design so that a drive ratio of about 2.5 to 1 would be required. A sample batch was now being made and samples would be available this year.

The question of including the rectifier and probably the regulator within the generator body for railway service and thus save cable runs and simplify maintenance was a matter under consideration and it was thought it could be achieved, though whether it could be applied in all applications of alternators remained to be seen. Particular attention had to be paid to vibration, especially in railway applications, and the availability of suitable diodes, which would almost certainly have to be of silicon, at an economic price was a limiting factor at the present time. A great deal of work was being done by the company on the development of silicon diodes for its own use and transistorised integral rectifiers and regulators might well be the end result.

Four-Headlamp System

The four-headlamp system was said, in reply to a question, to be a coming thing for both commercial and private vehicles. The present double-dipping system had been a great boon but good as it was in the avoidance of dazzle it was at best something of a compromise, as the lamps had to perform two duties and could not be 100 per cent efficient for both. With the four-headlamp system, the lamps could be designed for maximum optical efficiency, the one pair for the long-range work and the other for the closer range and for passing.

The lamps could be side by side or one above the other; each pair consisted of one single-filament long-range main-beam unit and one double-filament meeting- or passing-beam unit. The latter had a filament at the focal point to give the best possible beam for meeting, while the second filament was used when the main driving beams were on, to give a wider deeper light on the nearer part of the road. A demonstration car was available and visitors were invited to see how effective the system was.

BOOK NOTICES

Trade and Technical

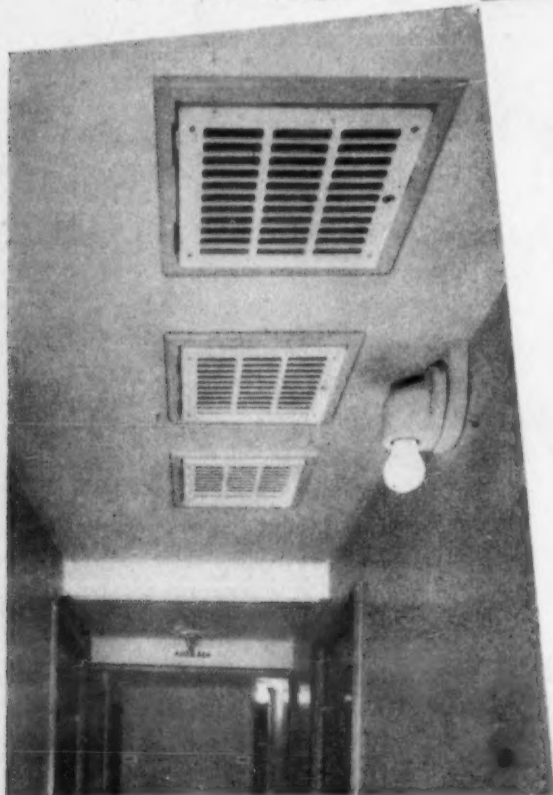
DIRECTORY OF SHIPBUILDERS, SHIPBUILDERS AND MARINE ENGINEERS, 1959. (London: Tothill Press, Limited, 33 Tothill Street, S.W.1 Price 40s.) The 57th year of publication sees the addition of particulars for more than 280 foreign shipping companies not previously included in this volume and a useful feature is the grouping wherever practicable, with appropriate cross-references, of the single-ship companies favoured by many users of so-called flags of convenience. There is still a number of quite large foreign shipping firms omitted, but that is not the fault of the publisher. There have also been additions to the lists of shipbuilders and marine engine manufacturers.

BRITISH CANALS. An illustrated history by Charles Hadfield. (London: Phoenix House, Limited, 38 William IV Street, W.C.2 Price 36s.) One of the most enjoyable of the spate of canal books which appeared in 1950 was that of Charles Hadfield; we are delighted that after nine years it has been reissued. Much of the original volume has been rewritten to make use of fresh material Hadfield has found in the course of his continuing researches. He has since published a book on the Canals of Southern England and has the Canals of South Wales and its Border about to be published. The new edition of the standard canal history takes the story along to the Bowes Report of 1958 and is illustrated by more than 40 prints and 15 maps. Hadfield is not only a good historian; he knows how to present canal history with a wealth of interest and a clarity of description that leaves the reader unable to drop the book until he has finished his exploration of its pages.

'Darvic' p.v.c. ventilation slats made by John Brown & Co., Glasgow, in R.M.S. Sylvania which they built for The Cunard Steam-Ship Company Limited.

'Darvic' aboard R.M.S. Sylvania

Deckhead ventilation slats made from 'Darvic' p.v.c. by Thermotank Ltd., in R.M.S. Sylvania, built for The Cunard Steam-Ship Company Limited by John Brown & Co., Glasgow.



'DARVIC' P.V.C. SHEET has many valuable applications in marine engineering. Aboard R.M.S. Sylvania it was used for a few large ventilators on deck and six small deckhead ventilators in corridors. Three shower trays in first class cabins and six side light frames in tourist cabins are also made from 'Darvic'. 'Darvic' is a durable and handsome material—light, long-lasting and easy to keep clean. It is rigid even in thin sheets. It cannot rust or corrode and has good dimensional stability in atmospheres of varying humidity. 'Darvic' is sold in a wide range of colours and in multi-colour laminates.



'Darvic' is the registered trade mark for the rigid p.v.c. sheet made by I.C.I.



TRENDS IN MOTOR BUS CONSTRUCTION

Call for Cheaper and Lighter Vehicles

SHOULD THERE BE FEWER COMPLICATIONS?

IN a paper presented this week to the 33rd congress of the International Union of Public Transport, Mr. E. R. L. Fitzpayne and Mr. W. M. Little, respectively general manager of Glasgow Corporation Transport Department and transport manager, Edinburgh Corporation Transport, set out the results of their inquiries aimed at determining the progress made in bus design since the last congress. They managed also to set a good example by making firm comments and deductions on most of the points rather than leaving them in an inconclusive state.

The first question raised the effect upon design progress of the high taxation levied in Britain and other countries on fuel. Replies indicated some divergence of view as to results, one school of thought holding that undue leaning towards fuel economy might distort the best design as a whole and the other that high taxation was an incentive to design both engine and vehicle to achieve maximum economy. The authors suggested that too high a proportion of the total operating cost being attributable to fuel could be the deterrent to much wider adoption of automatic transmission in existing vehicles. Costs of fuel varied from 5 to 22 per cent of running costs and taxation varied from 2 to 200 per cent on basic prices. Certainly in Austria, Finland, Algiers, Switzerland, Germany, Ireland, Great Britain, Italy, Sweden and France where the total price of fuel ran from 30.9 to 60.6d. per gallon operators should have some amelioration of fuel costs from some source.

Ten-Year Life Favoured

The next question raised the desirability of designing a vehicle for a maximum 10-year life during which no major mechanical faults would develop. This period should be sufficient for manufacturers to write off development and tooling costs and should show a marked reduction in initial capital cost and a considerable saving in weight. Some surprise was occasioned by certain operators stating that they did not even expect a bus life as long as 10 years. In the main, however, the majority would be satisfied with a life of that length, while appreciating that to achieve this free of major overhaul and, at the same time, improve the economic aspect, required a greater degree of standardisation of types and that component manufacturers must be guided to a new consideration of the life required of their products. It could be said that a lighter vehicle with a life of about 10 years was generally favoured and it might well be that there would be a change of outlook in countries where vehicles were at present built for a longer life.

Whether use of a smaller-capacity engine with an extended speed range to yield the required horsepower was favoured, in view of the saving in cost and weight that it would afford as well as giving savings by reducing the size of all transmission components, was the next question raised. The smaller high speed engine would require much more attention to the transmission. In addition it was at present far more difficult to produce specific consumptions which were attractive as compared with the medium speed engine. General conditions to be met on any engine design were adequate breathing and fuel quantity control. The former could be achieved by careful development and by the use of some extraneous means such as the supercharger. It might well be that an approach to a controlled use of the turbo to extend the speed range and top end horsepower without increasing the maximum torque unduly, might be of some value.

Smaller Engine Favoured

There was no doubt, however, that in the present trend of development the improvements in fuel injection equipment, valve gear and the like, would all tend towards improved economies and a point of argument would, therefore, be the relationship of engine cost and weight in itself, as opposed to the transmission problem. The majority of answers favoured the small engine, particularly when this was linked with supercharging. It was, however, obvious that some operators were suspicious of higher maintenance cost from the high-speed engine, but to take this view too narrowly ignored the advantages in vehicle weight and capital cost which might well be obtained.

Following this point about higher-speed engines, the authors went on to raise the question of whether more attention should be paid to automatic transmissions in view of the savings which these together with reduced capital cost and weight could give. It was pointed out that the simple clutch and gearbox inevitably offered the cheapest form of transmission and that a less complicated form than fully automatic, based on the effortless use of the clutch, was the present trend of design. Use of the hydrokinetic torque converter as an approach to the automatic transmission had found considerable favour in the United States and Europe and where the horsepower-to-weight ratio was extremely high the deficiencies of the use of this system were not clearly apparent. Where, however, the horsepower-to-weight ratios were low, as in the case of heavy public service vehicles, the extension of use of the converter by means of gearing became a necessity.

Automatic Drive Worthwhile?

With the interposition of considerable gearing it might well be that the semi-automatic type of transmission with finger-tip control might prove more desirable than the fully automatic unless the latter could be achieved at a reasonably cheap price, and without undue complication. So far there was no evidence that fully automatic transmission universally improved fuel consumption. The apparent complications of obtaining both fully automatic drive and good fuel consumption seemed to deter most people.

Asking whether an optimum performance figure in horsepower to weight and acceleration could be evolved, the authors questioned whether the trend towards larger capacity and heavier vehicles was not wasteful in view of present traffic congestion in cities. Answers were somewhat inconclusive although it was clear that the majority demand was still for greater capacity to the maximum passenger load allowed by the varying regulations in different countries. The authors maintained, however, that further study of the economic use of very large vehicles was still necessary.

Expecting to arouse controversy, the next suggestion made was that, if a short vehicle life was desirable, then such refinements as brake adjusters, automatic lubrication and powered steering would be superfluous with the designer concentrating on a simple chassis with easy maintenance. As it turned out, on a straightforward yes and no basis views were almost equally balanced, but it was clear that the situation in Britain differed from most other countries. Powered steering had advanced in France and Germany and with certain vehicles front axle loads demanded this facility, particularly for the operation of one-man buses. Brake adjusters and automatic lubricators were almost entirely British features.

While braking today could be effected safely and without undue fatigue by any well-designed power-assisted system, operators were still looking for improvements in cost. Brake lining materials and springs together accounted for more than 50 per cent of the cost of material issued for maintenance in periods between major overhaul. It was particularly desirable on city service work that the driver should have a standard control system irrespective of the particular vehicle, and he should be relieved from any undue fatigue arising from steering retardation and gear control to the maximum extent. Powered steering was not really an essential provided that the front axle weight was kept to a reasonable figure, but provided that the unit did not become unduly expensive or troublesome and at all times maintained a constant performance, ease of steering was a desirable objective.

Springs

The conventional semi-elliptic spring had much to recommend it. Independent front and rear suspensions had been tried in most countries, but with generally improving road surfaces it became a matter for some doubt whether a complicated suspension system was desirable both from cost and maintenance. The main feature of an air suspension was, the authors felt, the ability to provide constant height of platform entrance and step irrespective of load and with the ability to provide a suspension rate to meet the varying load requirements of a public service vehicle. If the weight of the bus was reduced so that the laden to unladen ratio was materially altered then this adjustment ability might well be necessary.

As regards some of the other additional equipment items such as brake shoe adjusters and lubricators, the view could be taken that they were basically required to cover deficiency in initial design. There was a strong body of opinion expressing the view that the ultimate advantages in total cost were doubtful and that a simple, straightforward layout reducing maintenance tasks to minimum requirements in time was the better approach. If a vehicle was to be produced cheaply and to minimum weight this would seem a more logical view.

Bodywork

Comparison of integral body structure with the conventional underframe was the seventh subject tackled. It was suggested that since integral construction required complicated jiggling and tooling the conventional method was essential if the aim was to reduce capital cost. The latter also provided flexibility of body design. It was found that half the operators favoured integral construction and all the operators in the Netherlands where taxation was by weight. This confirmed the authors' view that there was every likelihood of the weight being less with this type of construction. It was also noted that where demand was sufficient the cost was no greater than for the chassis-cum-body type. On the other hand it seemed that separate bodies could still be produced at competitive prices. There could be advantages in the completion of a vehicle by a single manufacturer. It seemed likely that there would be a reduction in the initial cost of unified construction but that there was more likely to be a continuing increase in capital cost in the case of the conventional separate body and chassis.

The degree of importance placed on passenger comfort was the next matter raised. A substantial majority of operators was felt to favour acceptance of some increase in chassis cost for the sake of passenger comfort, but there was great difficulty in finding any real agreement on method. It was, indeed, felt that while there was this apparent willingness to pay for comfort, the vast majority of operators was concerned primarily with cost of operation and that largely governed basic design. Messrs. Fitzpayne and Little were firmly of the opinion that, for city work, speed of travel was more important than absolute passenger comfort and that it could not yet be proved that anyone was prepared to pay more than their existing fare for such amenities.

Almost complete unanimity was found on the last suggestion, namely that further attention should be given to the driver and his requirements. One or two people felt that there might be a danger of comfort creating boredom and affecting the driver's vigilance, but this factor was considered irrelevant to city conditions. Manufacturers were urged not to be complacent about the stage at present reached by their vehicles for one-man working. There were many devices which could still be included to ease the driver's task by reducing the number of separate operations involved in starting and stopping.

Forthcoming Events

Until June 4.—Business Efficiency Exhibition. At Grand Hall, Olympia.
May 30.—Light Railway Transport League. Paper by Mr. D. W. K. Jones, "London and Points East." At 153 Drummond Street, N.W.1. 6.30 p.m.
May 30.—Norbury Transport and Model Railway Club. Cruise in canal boat *Joanna*.
May 31.—Southern Counties Touring Society. The Thameside railway tour.
June 2.—Institution of Plant Engineers (London). Paper by Mr. J. G. Michie, "Development of the Yorkshire Motorway." At Royal Society of Arts, John Adam Street, W.C.2. 6.30 for 7 p.m.
June 6.—Omnibus Society (Northern). Tour of Northumberland Independents.
Railway and Canal Historical Society. Visit to Poynton Colliery Railway.
June 6-11.—Permanent Way Institution. 75th Anniversary Convention. In London.



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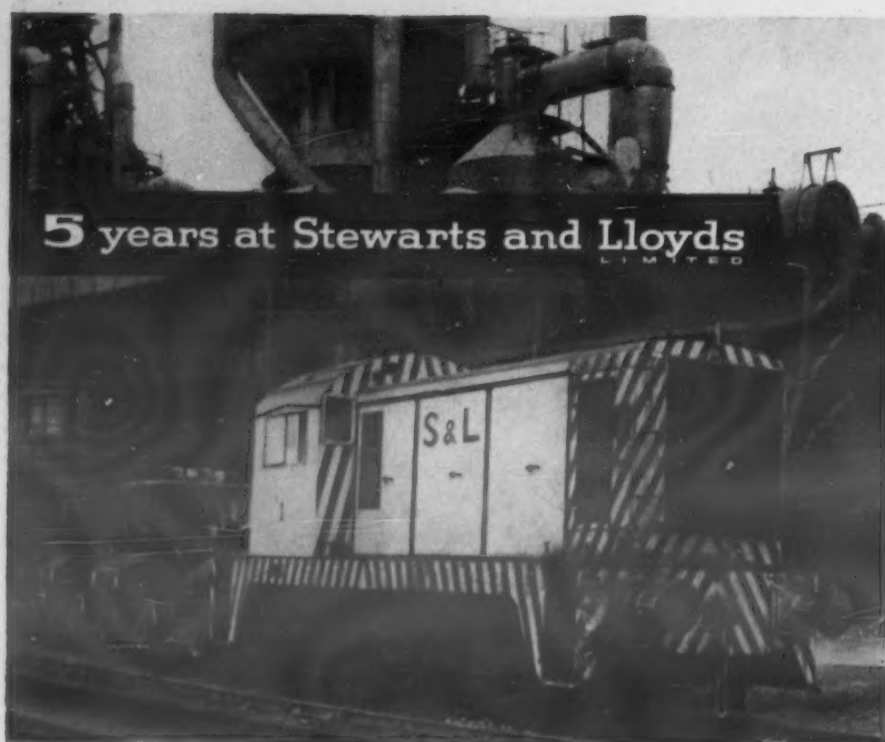
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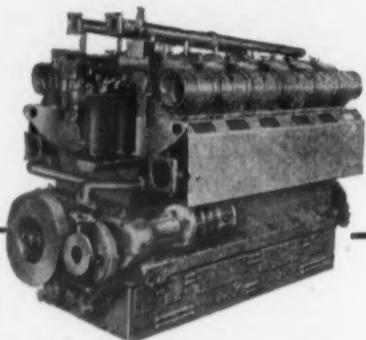
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NEWS FROM ALL QUARTERS

C.I.E. Stock Issue

Lists opened on Monday this week for a £3 million issue of 5 per cent transport stock by Coras Iompair Eireann. The purpose of this issue is to provide C.I.E. with additional diesel locomotives, rolling stock, road vehicles, plant and machinery. Diesel traction is to be extended to the former G.N.R. lines.

Liverpool Bus Tour Season

The 1959 season of Liverpool Transport city tours, which, during the eight years up to and including last year, have carried well over 130,000 passengers, made a good start at Whitsun weekend when 1,715 people left the Pier Head in a total of 37 buses on the two tours, centred about Speke Hall and the port system respectively.

Ayr Coast Diesel Trains

Diesels will replace steam trains on the Scottish Region Glasgow-Ayr route this autumn. This means an improved and faster service with a daily service of 28 trains in each direction in place of 20 steam trains. "Inter-City" (Glasgow-Edinburgh) type diesel sets will be allocated. In 1958 such trains carried 700,000 additional passengers between the capital and Glasgow.

Latest D.S.G. Sleeping-Cars

The first units of a new series of D.S.G. sleeping-cars have recently been delivered for use on the German railways. They will go on the following services: Munich-Hamburg; Munich-Dortmund; Munich-Kleve (Cleve); Stuttgart-Hamburg; Hamburg-Basel-Zurich; Dortmund-Zurich; and Dortmund-Interlaken. This class of sleeping-car incorporates an air-conditioning system individually adjustable for each compartment. It supplies each car with 3,200 cu. ft. of fresh air per hour. The berths are 2 ft. 7½ in. wide and are fitted with foam rubber and rubber hair mattresses and also adjustable headrests.

Brussels Traffic Handling Praised

Reviewing the successful efforts made by the Brussels police to handle extra traffic for the 1958 exhibition in the city, Mr. De Grijse, Brussels Police Commissioner, explained that it was made possible because the city road system was adapted to the circumstances and there was thus never any saturation. In the modern part of the town, an indispensable collaboration took place between the police force and the engineers and town-planning architects. Furthermore, parking accommodation was made available to a total of 1,858,000 vehicles. The police used 22 radio transmitters, 80 radio police cars and telephone posts at 30 important junctions. One of the big Brussels stores, Au Bon Marché, has observed that the hopes placed in the execution of the vast rationalisation and modernisation of the "small belt" highway were absolutely fulfilled. The work accomplished has proved by its results the efficiency of intelligent and daring town-planning measures. Many Brussels shopkeepers had earlier condemned the work on the "small belt," believing it would endanger commerce in the centre of the town.

Irish Train Stewardesses

Stewardesses have been introduced in two trains each way on the Dublin-Cork service of Coras Iompair Eireann. They will look after passengers' requirements and gauge their reactions to various aspects of rail travel.

Delivery Van Concession in Paris

It is reported that the Paris authorities are to extend the blue zone, with its disc parking system, to a further area of the central business zone. In about 20 additional streets, it is stated, parking will be prohibited between 8 a.m. and noon except for goods vehicles making deliveries to premises.

Southampton-Woolston Bridge

Hants and Dorset Motor Services, Limited, is supporting a Southampton Corporation proposal to build a bridge across the Itchen to Woolston, replacing the existing floating bridges. It is understood that when the bridge is completed the company hopes to extend into Southampton certain services at present terminating at Woolston.

Flat Drum Pallet

A newly designed drum pallet is offered by Powell and Company, Barry Port, Carmarthen. It is constructed throughout in rectangular section hollow steel tubing. Each pallet carries drums in units of three of 40-50 gal. apiece "on the roll" side by side, and the fork clearance is 2½ in. Although strong enough to permit tiering four high, the individual pallet is light enough for one man to carry.

A Study of Preventive Maintenance

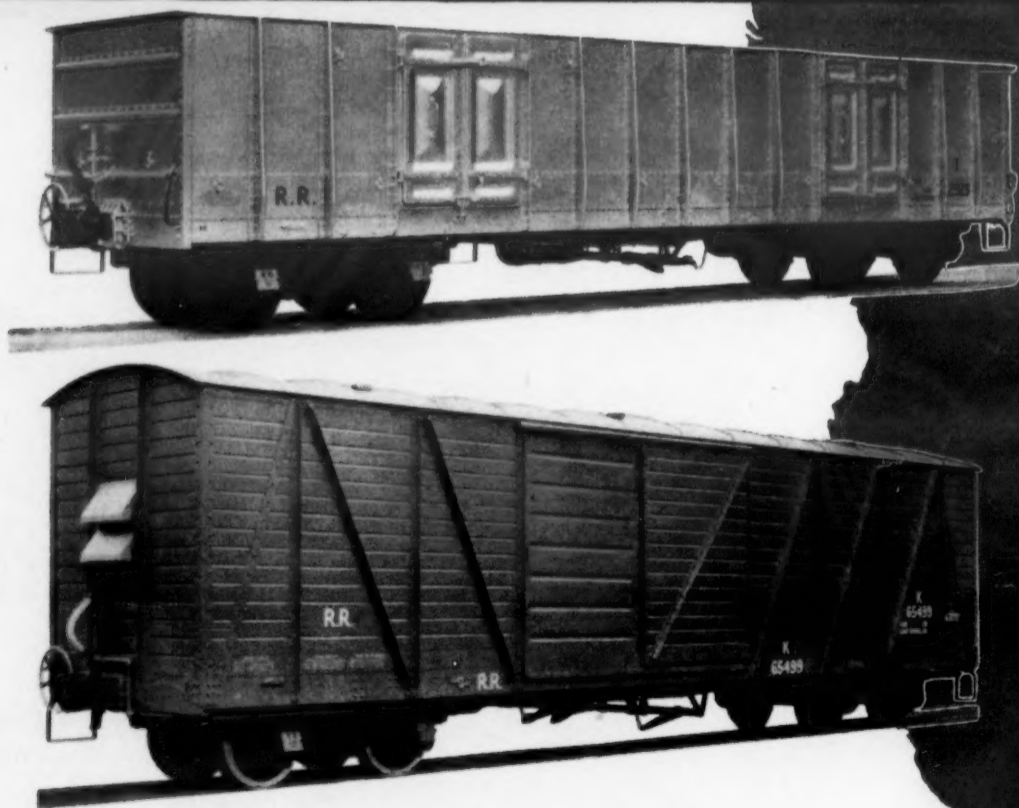
Preventive maintenance will be the subject of a series of three day seminars that the British Institute of Management, in collaboration with the British Productivity Council, is holding this autumn in London, Glasgow and Manchester. Mr. R. B. Wilson, an American authority on the subject at present acting as a consultant to the European Productivity Agency, will act as leader on each occasion. These seminars are intended for factory engineers, plant engineers, production managers and planning managers.

York Road Junction Replanned

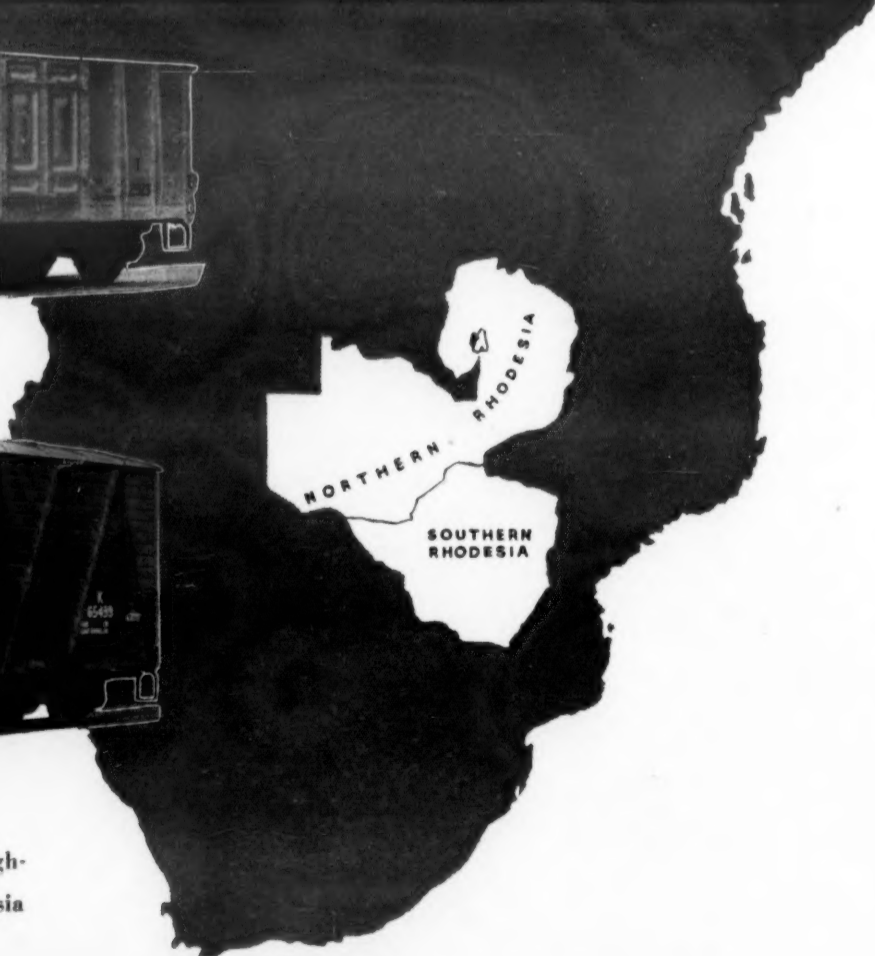
Work will commence shortly on the first stage of the diversion of Lambeth Palace Road. The improvement, which arises from proposals to extend St. Thomas's Hospital, comprises the diversion of Lambeth Palace Road to form a new junction with Westminster Bridge Road, and a realignment of Westminster Bridge Road between York Road and Addington Street. In addition, Addington Street will itself be realigned at this intersection. The present dual roundabout system will ultimately cease with the closing of Stangate to vehicular traffic and the single roundabout now to be formed will replace the two existing. Two pedestrian subways will also be constructed, one across Westminster Bridge Road and the other across the new Lambeth Palace Road.



WAGONS FOR RHODESIA



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COMMERCIAL AVIATION

Progress Toward Europair

VISCOUNT HOURS FOR B.E.A.

THE presidents and general managers of the following airlines, Air France, Alitalia, Lufthansa and Sabena, met in Paris on May 20 with a view to continuing their negotiations on the creation of a common organisation for the commercial operation of their international services. They reached agreement on the basic question of the shares of each participant in this communal undertaking and also agreed on the definition of traffic which would apply to the joint operation. Further study is being given to the reports established by the legal and economic committees. A provisional secretariat is to be established in Paris and several permanent committees have been constituted, the members of which have been nominated and charged with putting the new organisation into operation.

Dublin Traffic

In the quarter ended March 31, 1959, Dublin Airport had 3,847 movements by aircraft on air transport service and of the 81,629 passengers handled 81,303 were making originating or terminating journeys. Freight totalled 1,924 tons.

T.W.A. Interline Agreement

Trans World Airlines has concluded interline passenger agreements with two British steamship lines: the P. and O. and Orient. The main significance for T.W.A. in the new agreements is connected with its flights to and within the Far East, where destinations are shared with the lines.

New B.O.A.C. Coach Livery

A new livery has been decided upon for coaches of the British Overseas Airways Corporation. It has many points of similarity with that adopted on B.O.A.C. aircraft. The roof, as before, is white but this white is extended downwards till it meets a broad blue band edged with gold running the full length of the vehicle beneath the windows. Below this band the vehicle is painted silver.

K.L.M. Electra

The first Lockheed Electra turboprop air liner for regular airline service in Europe—one of 12 ordered by K.L.M. (Royal Dutch Airlines)—has reached the end of the final assembly line at Lockheed's California Division and is scheduled to fly early next month. This aircraft is the international version of the Electra and incorporates extra tanks which increase total fuel capacity by 900 gal. Four K.L.M. Electras are due for delivery this year.

New Services Approved

The Minister of Transport and Civil Aviation, after considering the recommendations of the Air Transport Advisory Council, has approved the operation of the following services:

An internal service between London (Blackbushe) and Jersey; Dan-Air Services, Limited, from June 13, 1959, until September 12, 1959.

An internal service between London (Blackbushe) and Jersey; Eagle Airways, Limited, from June 13, 1959, to September 12, 1959.

A normal scheduled service between Leeds and Basel; B.K.S. Air Transport, Limited, from May 18, 1959, to June, 1965.

I.A.T.A. and Production Planning

World airlines have started joint studies of the application of industrial methods of production planning and control to their maintenance and overhaul work, it has been announced by the International Air Transport Association. Following preparatory exchanges of information in which 21 airlines have taken part, I.A.T.A. has begun studies of key phases of p.p.c. as applied to the operations of its 87 members throughout the world. These are being undertaken by a special production planning and control group of the I.A.T.A. Technical Committee with Mr. H. J. Heinrich, Trans Canada Airlines, as group chairman.

More T.W.A. Jet Plans

The average load factor on Boeing 707s of Trans World Airlines from their entry into service on March 20 to May 21 was 95.9 per cent. During the first three weeks of April it climbed to 98.5 per cent. From March 20 to May 17 they completed 99.5 per cent of their scheduled mileage. Coinciding with the delivery last week of its eighth Boeing 707-120, T.W.A. announced further expansion of its jet services within the United States. June 27 will see the inauguration of daily jet flights between Chicago and San Francisco and on July 12 T.W.A. will add a further daily round-trip jet service between New York and San Francisco making a total of three daily jet flights in each direction linking these two cities. From July 21 the airline will inaugurate a new jet service between New York and St. Louis plus an additional daily jet from New York to Los Angeles and return, making a total of six jet flights daily on this important coast-to-coast route. An additional Boeing 707 service will be added to the Chicago-Los Angeles route from July 25.

More First Class Passengers on B.E.A.

While British European Airways was firmly pursuing its get the fares down policy more of its passengers than ever were flying first class, it was stated by Lord Douglas of Kirtleside, the chairman, in his latest message to the staff. It was expected that, during the current year, about one in every 12 passengers would travel first class—a total for the full year of about 250,000 passengers. In April, 5 per cent of the international and over 20 per cent of B.E.A. domestic traffic was first class. In that month the first-class seating accommodation in the V806 Viscount air liners had been increased by a third—from 12 to 16 seats. Nearly 18 per cent more passengers were carried last month than in April last year, while freight ton-miles flown showed an increase of 33 per cent. "A large part of the economic success which we have achieved with the Viscount fleet during the past six years," wrote Lord Douglas, "has been due to the rapid progress which we have made in increasing aircraft utilisation—that is to say, the amount of work we get from each aircraft each year—and in raising the approved overhaul life of its engines. With the V701 Viscount, the utilisation is now running at nearly 2,500 hr. per annum and the approved life of its Dart 506 engines is now up to the remarkably high figure of 2,300 hr. The utilisation of the V802 is running at over 2,000 hr. per annum and the life of the Dart 510 engines which power it is now also 2,300 hr. The V806 Viscount, which has been in service for only 16 months, has already reached a rate of aircraft utilisation of 2,000 hr. per annum and the approved life of its Dart 520 engines is already up to 1,500 hours. The particularly rapid progress in engine development on the V806 is indicated by the fact that the approved life of its engines went up by 1,000 hours in just over a year."

PRESIDENT OF I.R.S.E.



D. G. Shipp

Mr. D. G. SHIPP, B.Sc., M.I.E.E., M.I.R.S.E.

Among the first duties of Mr. Douglas G. Shipp following his assumption of the presidency of the Institution of Railway Signal Engineers, already recorded in MODERN TRANSPORT, was to lead the party of nearly 200 taking part in the annual summer convention; this year's highly successful event, which consisted of a visit to Northern Italy, was concluded last week. Mr. Shipp, who is assistant manager, signal and colliery sales and engineering division, Westinghouse Brake and Signal Co., Limited, was born in 1907 and educated at St. Dunstan's College. After a four-year at Northampton Engineering College, including practical experience with the British Thomson-Houston Co., Limited, he graduated at London University in 1928, thereafter joining the engineering department of the Westinghouse Brake and Saxby Signal Co., Limited. In this he was engaged in the development and design of many signalling products, including particularly equipment evolved to counter the special problems found on electrified railways. As a member of the Territorial Army he went to France with the B.E.F. and on his return was commissioned in the R.A.O.C., later being transferred to R.E.M.E. upon the formation of that regiment. Promoted major, he became principal instructor on radar equipments in the wireless branch of the Royal Military College of Science until 1943 when he was seconded to the Admiralty Signal Establishment for special duties connected with radar development. Demobilised in 1946, Mr. Shipp returned to his previous position with the Westinghouse Brake and Signal Co., Limited, and in the same year was appointed electrical engineer in charge of the engineering department. He also assumed at that time responsibility for the design of electrical equipments for railway and automotive brakes. Following reorganisation of the company in 1951, he took up his present appointment. He was elected an associate member of the Institution of Railway Signal Engineers in 1931, a member in 1948 and a member of council in 1949. Since then he has served on six of the institution's executive committees. He is a member also of the Institution of Electrical Engineers.

R.H.A. ANNUAL DINNER

Hauliers and Rail Competition

LORD HAILSHAM SPARKLES

BECAUSE of the demand for places, the Road Haulage Association this year substituted an annual dinner for the annual luncheon which has hitherto been held to mark the election of officers and national council. The change is to be a permanent feature; Mr. R. N. Ingram, the national chairman, presided at Grosvenor House on Wednesday last week, wearing in public for the first time a new chain of office presented by Mr. E. J. Shaw, of Sheffield.

The dearest wish of the R.H.A., said Mr. Ingram, was to see road haulage no longer a "political storm centre," but at the immediate moment he regretted certain aspects of the present Government attitude towards transport. "From the early days of road transport" (said Mr. Ingram), "when its rapid growth clearly indicated that it was to become an important factor in our transport system and a serious threat to the monopoly hitherto enjoyed by the railways, the industry has suffered the combined effects of a spate of restrictive legislation and of special taxation at a most penal level. In contra distinction, the railways are receiving from the Government colossal sums of money, firstly to pay for their modernisation programme and, secondly, to meet their rapidly mounting trading deficits. These sums are described as loans but there is little doubt that the bill will ultimately be met by the taxpayer." The road haulage industry's main claim upon a Conservative Government was that this position should be adjusted so that real equality of competition between the two forms of transport could be established.

Hauliers Tied to Traffic

He applauded the expansive policy of the Government in transport matters with one reservation. While the Government provided them with opportunity to show their skill and ingenuity, they persisted in keeping the industry tied to a licensing system, administration of which had to some extent become too rigid. There was a growing trend, which the railways had not been slow in aiding and abetting, to tie the haulier much too rigidly to carrying the same traffic year after year. "In the natural process of time he is bound to find that some of his traffics diminish in importance and that some of his customers go out of business. He should at least have a reasonable opportunity to replace this sort of wastage, particularly in view of the Government's desire to see industry expand," said Mr. Ingram.

Viscount Hailsham, Q.C., Lord President of the Council, was principal guest and what he had to say about renationalisation members found very much to their liking. "Your free enterprise road haulage has been made the subject of attack. Whatever may be true about the six hundred companies, whatever may be true of unnamed industries who, to use the hypocritical phrase current at present, are alleged to have 'failed the nation', you, and the iron and steel industry, are in the front-line trenches. You did not choose to be there. You were put there. But, unless you can help persuade the voters to save you, you are for it," declared Lord Hailsham.

Electoral Tit-for-Tat

Warming early to his task, he went on: "You have been singled out for this attack through no fault of your own. No one can accuse you of being a monopoly. On the contrary, your industry is one notable for its competitive character. Whatever may be true of railways, or airlines, or steamship companies, road haulage is not subsidised by Government. Nor can it be said that your prices are excessive. No, it is no fault of yours that you have been put in the front-line trenches. You have been put there first and foremost as a piece of political spite, a kind of electoral tit-for-tat. You have proved in your own field that free enterprise works. So long as you are allowed to exist, you provide a classic example of the folly of nationalising a competitive industry."

Pausing for a moment, he uttered a word of caution—"It is, of course, the duty of the Government to see that publicly-owned transport operates as efficiently and as profitably as possible"—then, "but it is not the duty of the Government to cripple road haulage in order to bring that about. We intend that the Government should play fair to both forms of transport. Your enemies, I am satisfied, would prefer to handicap the private enterprise transport in order to help the public form."

Nationalisers on the Defensive

"Keep up your campaign against nationalisation," thundered Lord Hailsham, "and all may be well. The nationalisers are angry that you dare to defend yourselves. But they are angry because they are frightened. It is therefore to your interest to keep on. Nationalisation began as a crusade. It continued as a racket. It is becoming an embarrassment. When the time comes that it is made a liability, the fight will be over. Your one chance of survival lies in the utmost courage and aggressiveness."

"Behind yourselves, behind iron and steel, and behind the six hundred companies are an indefinite number of industries that will be nationalised when they are said 'to fail the nation'. But what is meant by 'failing the nation'? We are not told. Neither road transport nor iron and steel which are named have failed the nation. Who will decide what they mean by 'failing the nation'? Why, they will, of course. They will be judge, jury, prosecuting counsel, court of appeal and executioner."

"Heads I Win . . ."

"Mr. Herbert Morrison, who still carries much weight in Socialist circles, has given his own definition of 'failing the nation'. It covers nearly everything. Inefficiency, high prices, excessive profits or monopolistic practices. If an industry is large it has failed the nation because it is a monopoly. If it is small, it has failed the nation because it has established cut-throat competition and refused to 'rationalise'. If you do not make profits you have failed the nation by being inefficient. If you do make profits you have failed the nation because you make them. If your prices go up in the same way that the cost of coal has gone up, why then you have failed the nation because they are high. If they go down like road haulage you have failed the nation because the financial weakness of the railways is laid at your door. There is no escape. When there is nothing else to be said against an industry it is just one of the gallant six hundred which 'dominate the production, in-

(Continued on page 12)

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G. N. WIDENING

(Continued from page 3)

A special design of tunnelling shield, having a diameter of 31 ft. and weighing about 150 tons, was used. Two were employed, both being fitted with hydraulically operated erector arms for lifting upper voussoirs into position. Each shield had four galleries, in each of which clay was excavated by pneumatic shovels. The spoil was cleared into one or other of two vertical chutes feeding into a conveyor belt which transferred the spoil to a hopper behind the shield and thence to skips hauled by diesel locomotives on narrow-gauge rails to the tip site.

The shield, the erection plant, the trailing platform and the conveyor belt were designed jointly by Charles Brand, Limited, the contractor for the tunnelling, and Joseph Westwood, Limited, of Millwall, which firm also constructed the shields.

Lining

The internal diameter of the tunnel is 26 ft. 6 in. The tunnel lining is formed of interlocking concrete segments, which were precast and were placed in the tunnel in direct contact with and pressing against the clay. No grouting or bolting was used. The concrete segment lining was erected in rings 18 in. wide to produce the same result as a bolted-up cast-iron ring. These were the first railway tunnels in Britain to be lined in this way and an illustrated description of the method of construction appeared in our February 22, 1958, issue. The cost of a tunnel lined in this way is 40 per cent less than the figure for lining throughout with conventional cast-iron segments.

Special concrete segments designed to maintain the interlocking were cast for the tunnel rings, which have to accommodate workmen's refuges in the tunnel walls and for the apertures for the two ventilation shafts which were driven from the surface to the Potters Bar tunnel bore. The concrete used (except in the large invert segment) is Sealithor metallurgical supersulphated cement. This is capable of withstanding the attack of the dilute sulphuric acid which is produced when steam locomotives are used in a confined space. It is, moreover, particularly well suited to the stiff London clay in which the tunnels are situated, having a 28-day compression strength of about 7,000 lb. per sq. in. The segments were all cast in a factory specially erected near the scene of operations.

Cutting Widening

The widening of cuttings took place at Greenwood, at the sites between the tunnels and at the north end of Potters Bar tunnel. The earthworks were carried out by draglines and bulldozers and the cutting slope was graded generally to 1 in 4 as a first stage initial cut. The slope is also graded longitudinally; the highest point being midway between pairs of counterforts, to provide a watershed in both directions. The counterforts are wide drainage channels of depths of up to 10 ft. filled with graded material. When the final excavation of clay was taken out of the bottom of the cutting it was replaced not later than 24 hours afterwards by a blanket of sand. This was done to ensure complete stability of the tracks. The usual track ballast was placed on top of this sand blanket.

As a result of certain pre-staging work which had been carried out in the autumn of 1958 it was possible to effect the changeover from two- to four-track operation during a series of five weekend possessions commencing on April 4-5 and finishing on May 2-4. During these weekend possessions tracks were slewed over to their new positions and such work as remained to be done in the way of preparing the bed for the laying-in of the connecting lengths of track at each end of the works was carried out. The new down slow line was brought into use as a temporary down main on April 4, 1959. On April 27 the old main lines through the old tunnels became the up slow and up fast and finally the new down fast was brought into use on the morning of May 4. Although Charles Brand, Limited, was involved in parts of this work it was mainly the concern of the district engineer, Kings Cross, under whose direction the final staging was carried into effect. During these operations main-line trains were diverted via the Hertford Loop and special arrangements were also made for dealing with local services.

Hadley Wood Station

At Hadley Wood Station platforms have been provided to serve all four tracks, the centre tracks being the fast lines and the outer pair the slow lines. The station buildings at road level are situated on an overbridge and comprise a ticket office, booking hall and cycle store. Whilst the original structure has been retained at this point the interior has been completely modernised and the exterior cleaned and repainted. The ticket office, which has a modern front, has been equipped inside with Eastern Region standard steel furniture and fittings. A new ticket collectors' box and public telephone kiosk have been provided.

The footbridge and stairs to the platforms have been improved and the footbridge extended and a new staircase built for the new down platform. New platform buildings have been provided comprising waiting-rooms and lavatories, new staff and store rooms. Windbreak shelters are also provided. Planned on a 3 ft. 4 in. module the new platform buildings have door and window panels of prefabricated hardwood units finished with Isocyne lacquer. The public rooms are supplied with furniture specially designed for the Eastern Region architect and equipped with central heating. Cold cathode platform lighting is used; there is filament lighting in waiting-rooms and lavatories. There is special provision for switching off surplus platform lighting when it is not required. At Hadley Wood a triple-span bridge carried a local road over the double line and the west span of this bridge had to be reconstructed to provide space for the additional track. The new span has a partially prestressed concrete deck.

Contractors

The main contractor was Charles Brand and Son, Limited, with Henry Boot and Sons, Limited, as the sub-contractor for track laying. The contractor for the reconstruction of Hadley Wood Station was Kyle, Stewart (Contractors), Limited. Sir William Halcrow and Partners, consulting engineers, were responsible for the tunnel design and for supervision of the main contract. Apart from the tunnel, the works were designed in the office of the chief civil engineer at Kings Cross, the station buildings being the responsibility of Mr. H. H. Powell, regional architect. The whole of the works were under the general direction of Mr. A. K. Terris, chief civil engineer, British Railways, Eastern Region.

New colour light signalling has been provided
(Continued on page 12)

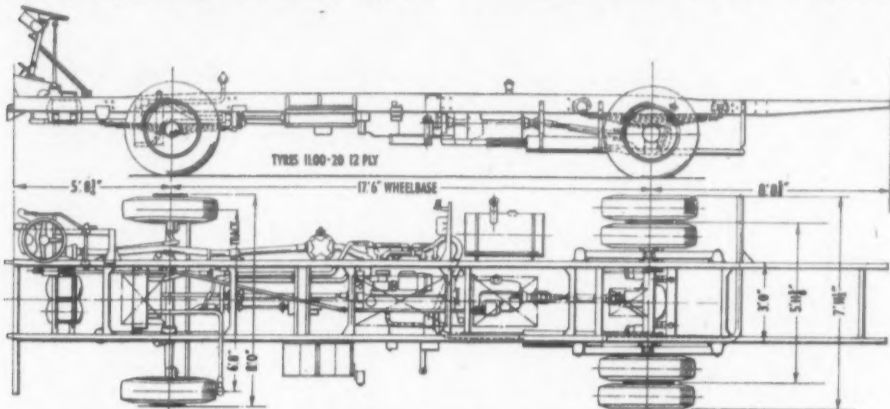
COMMERCIAL VEHICLE TEST

A.E.C. Reliance Export Bus or Coach Chassis*

PERFORMANCE AND ECONOMY AT 11½ TONS GROSS

LIVELY and smooth performance with economical fuel consumption were the outstanding characteristics of an A.E.C. Reliance export passenger chassis which we had over our standard test route recently. The export chassis is a natural development of the basic Reliance, with fitted chassis and heavier units where necessary to permit operation over not-so-good surfaces at two tons higher weight. Designed for use as either bus or coach at a gross weight of roundly 11½ tons

maxima at these settings. The introduction of mechanical drive, arranged by a simple two-gear train, to avoid the use of belt drives for dynamo, fan and water pump has already been mentioned and the incorporation of a viscous-fluid crankshaft damper when 2,200 r.p.m. is specified has been A.E.C. practice with this range of engines for some time. Alternative transmission arrangements are the standard A.E.C. five-speed gearbox, with inertia-lock synchromesh on gears 2 to 5, or Mono-



The drawing gives principal dimensions of the long-wheelbase A.E.C. Reliance export chassis

(11,680 kg.), the ready-for-road chassis weight of about 4½ tons leaves a useful margin for body and up to about 90 passengers in standee-bus form or for a maximum of luxury fittings and luggage as a coach. The export Reliance is already in service in various parts of the world and has won similar high esteem to that in which the home-market Reliance is held.

The export Reliance is available with a number of alternative features, such as air suspension all round, automatic or semi-automatic transmission, exhaust brake and automatic chassis lubrication, that give it a specification as advanced as any in the world. It is offered with 16-ft. or 17 ft. 6 in.

control—a fluid flywheel and Wilson-type epicyclic four-speed gearbox having electropneumatic control, which eliminates the clutch pedal. This system forms the basis of Automonotrol, which is also offered; by the addition of speed and torque sensors fully automatic control of gearchanging is provided, with full driver override facilities.

Big-Engine Advantages

The chassis provided for our test was equipped with the synchromesh gearbox and the highest of four available axle ratios—4.7 to 1. Loaded with weights, it turned the scale, with full fuel tank (32 gal.) at 11 tons 3 cwt. of which 4 tons ½ cwt.

TEST RESULTS AT A GLANCE

Vehicle Details
MAKER: A.E.C., Limited, Southall, Middlesex.
TYPE: Reliance export passenger chassis.
ENGINE: A.E.C. AH470 six-cylinder direct-injection underfloor diesel, bore 4.41 in. (112 mm.), stroke 5.12 in. (130 mm.), swept volume 470 cu. in. (7.68 litres); maximum power 125 b.h.p. at 2,200 r.p.m., maximum torque 325 lb./ft. (44.9 kg./m.) at 1,100 r.p.m.
TRANSMISSION: Clutch, single dryplate 15½ in. (399.5 mm.) dia., 297 sq. in. (1,929 sq. cm.) lining area, hydraulically operated; gearbox, five-speed synchromesh (except first), ratios 6.25, 4.4, 2.65, 1.56 and 1 to 1 forward, 6.01 to 1 reverse; driveshaft, open tubular with Hardy Spicer 1600 needle-roller-bearing universal; rear axle, spiral bevel gear with fully floating shafts, choice of ratios from 4.7 to 6.28 to 1.
BRAKES: Girling cam-operated shoes with Westinghouse air-pressure equipment and twin-valve actuation; total lining area 678 sq. in. (4,374 sq. cm.).
TYRES: 11.0-20 12-ply rating.
WHEELBASE: 17 ft. 6 in. (5,334 mm.).
WEIGHT: Chassis with full fuel, spare wheel and equipment in kerb trim 4 tons 4½ cwt. (4,309 kg.).

Test Results
ROUTE: Standard route in Kent and Surrey with London additions.
CONDITIONS: Fine and warm.
RUNNING WEIGHT: 11 tons 2½ cwt. (11,816 kg.) plus crew of three.
FUEL CONSUMPTION: 1. 16.3 m.p.g. (5.77 km. per litre) at 28 m.p.h. (45 k.p.h.) average speed for 15 miles continuous running. 11. 10 m.p.g. (3.54 km./litre) over 5 miles, making four stops per mile.
GROSS TON/M.P.G.: 185.8 (66.8 tonne/km./litre).
MAXIMUM GRADIENT CLIMBED: 1 in 5.
TURNING CIRCLE: 67 ft. (20.4 m.) wheeltrack.
ACCELERATION:
Averages of four runs through gears:
0-20 m.p.h. 9.7 sec.
0-30 m.p.h. 18.5 sec.
In top gear:
10-20 m.p.h. 13 sec.
10-30 m.p.h. 24 sec.
BRAKING: Average measured distance from 30 m.p.h. on dry level surfaces 44.5 ft. (13.5 m.), equivalent to 21.8 ft. per sec. per sec. or 0.68 g. overall deceleration. Handbrake alone from about 20 m.p.h. 36 to 38 per cent lapley meter.
ESTIMATED TOP SPEED: Over 60 m.p.h. (96 k.p.h.).
OVERALL FUEL CONSUMPTION: For 98 miles of hard driving, including 35 miles in heavy suburban traffic and many stops and special tests, 12.56 m.p.g. (44.5 km. per 100 litres).

wheelbase for 8-ft. wide and up to about 33-ft. long coachwork with either right- or left-hand controls. Attention has been paid to accessibility of units requiring regular attention and a new feature of the 470 cu. in. underfloor diesel engine is the provision of an auxiliary drive box to avoid the use of belts for driving the water pump and dynamo.

Chassis Features

Among major features of the export Reliance which distinguish it from the lighter version are channel-section fitch plates in the 8 in. by 2½ in. by ½ in. chassis sidemembers, fitted between the spring hangers on leaf-spring chassis and over the

was borne by the front axle. A crew of three brought the running weight during the test to 11 tons 8 cwt. This arrangement represented something of a compromise, since the high axle ratio would normally be selected for coach operation, probably with the short wheelbase and rather lighter chassis, when the loaded weight would generally be well below 11½ tons. The running weight of the chassis tested was equivalent to that of a fully loaded maximum-capacity standee-type single-decker, for which duty, except perhaps in predominantly flat or light-traffic conditions, the 5.22 to 1 or a lower axle ratio would be selected.

But the pulling power of the A.E.C. 470 engine, which another British manufacturer recently



A session with the heavy-duty Reliance on a "colonial" section during the test proved its quiet manners and controllability under conditions in which it will occasionally be used overseas

axles in air-spring versions. A wider rear axle is required to accommodate 11.00-20 twin tyres and a heavier front axle is fitted. Other differences include wider brakes, which give a total of 678 sq. in. lining area (or 61 sq. in. per ton of gross laden weight); standardisation of air pressure brakes, embodying Girling cam-operated shoes, diaphragm-type operating cylinders and duplicated reservoirs, valves and lines for front and rear; and a larger radiator.

Only the 470 cu. in. (7.68-litre) engine is offered with the heavy-duty chassis whereas in the light-weight Reliance the 410 cu. in. unit is available optionally. Both engines have proved exceptionally reliable and economical in the Reliance, Mercury and Regent V ranges and the larger unit in the present chassis can be governed at 1,800, 2,000 or 2,200 r.p.m. to give 103, 112 or 125 b.h.p.

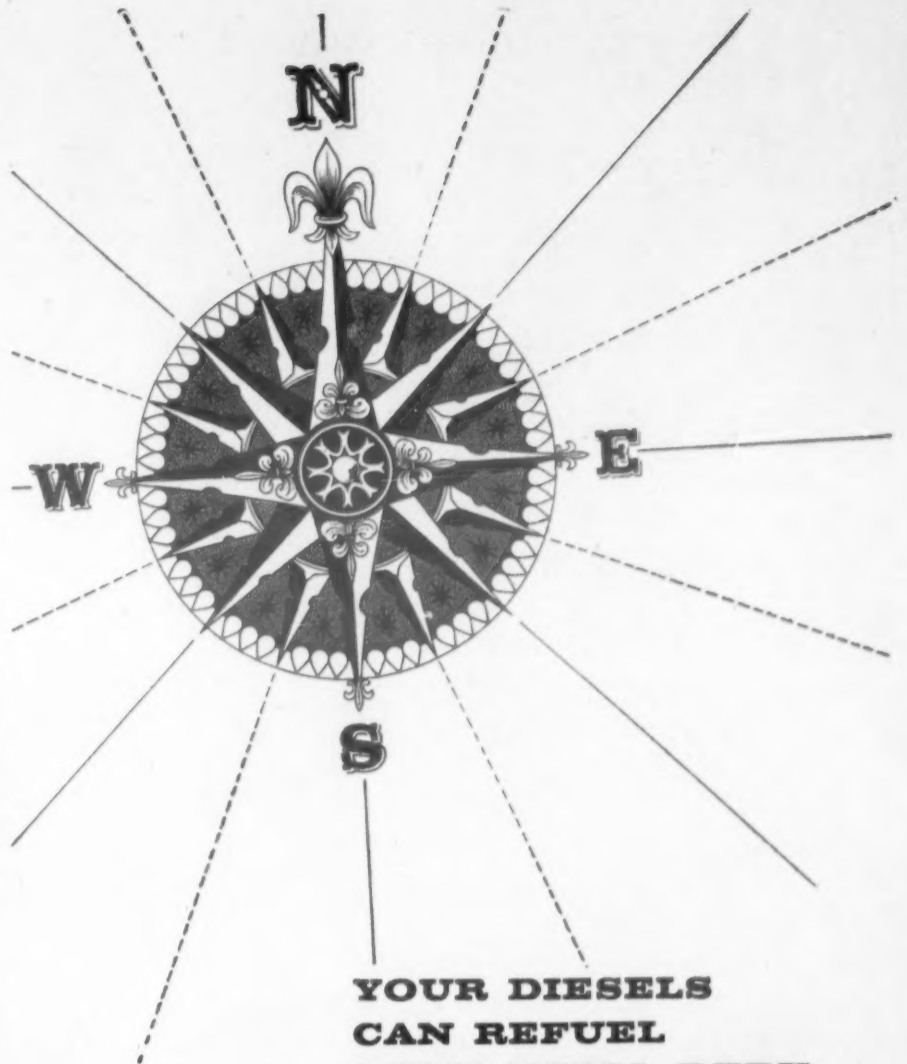
* No. 458 in the MODERN TRANSPORT series of road tests.

acknowledged by selecting it to power an eight-wheeled goods vehicle, was more than equal to the occasion and in fact conferred a degree of liveliness that was exhilarating and unusual in a vehicle of this class and weight. The extra 200 r.p.m. was extremely useful in keeping the vehicle moving well in traffic and had good effect on measured acceleration times, which were very favourable. Taken on a level stretch of the Great Chertsey Road as averages of four runs, two in each direction, for each result, the Reliance would reach 20 m.p.h. from rest in under 10 sec. in third gear and 30 m.p.h. in 18½ sec. in fourth gear.

High Top Speed

On the open road it was found that fourth gear gave a top speed of over 40 m.p.h. and in favourable conditions with maximum run-up of the governor the maximum speed in top gear was well

(Continued on page 12)



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Export Reliance on Test

(Continued from page 11)

over 60 m.p.h. This was combined with excellent low-speed torque so that although, with the high axle ratio and maximum weight, the measured direct-drive accelerations from 10 to 20 m.p.h. and 10 to 30 m.p.h. produced the rather slow times of 13 and 24 sec. respectively, the vehicle pulled smoothly and quietly away from these excessively

Rather more traffic driving than usual was involved in the Reliance test as the vehicle was collected from and delivered to the A.E.C. Southall works at the beginning and end of the run. Despite its greater-than-normal length, the vehicle proved light to drive in the heavy suburban traffic met on the route through Southall, Richmond, Putney, Wandsworth, Streatham and Purley. It is noted that power-assisted steering is not offered with the heavy-duty Reliance and if our own experience is typical, it will not be wanted even on vehicles for all-urban service. The worm-and-nut gear gave satisfactorily positive control at all speeds and, on a very warm day with the sun beating into an open cab, there was at no time any sense of being overworked, even in the worst of the traffic.

Without the added stiffness imparted by coachwork, some whipping of the chassis might have been expected at high speed on indifferent surfaces but there was no sign of this during our run; there was a very satisfactory feeling of firmness and stability in a short run over an unmetalled potholed road and in a fast run on the downgrade of Caterham By-pass a .6g deceleration from about 65 m.p.h. to 20 m.p.h. was made with perfect stability. The upgrade of Caterham By-pass provided an opportunity of testing the efficiency of the cooling system by making a slow run up with the engine pulling hard and slowly in fourth gear. In an ambient temperature of 70 deg. F. and with about two-thirds of the radiator blanked off to simulate the effects of body panelling, the running temperature recorded on the centigrade gauge had stayed steadily within a degree or two of 80.

During this particular climb and other hill work the highest figure reached was 90 deg. C.

Cold-brake performance was exceptionally good for 11½ tons on two axles. In a number of simulated emergency stops from 30 m.p.h. on dry tarmac our chalk-firing magazine produced good marks at the points of brake application and indicated an average stopping distance under these conditions of 44 ft. 6 in., which is equivalent to 21.8 ft. per sec. per sec. or 0.68g overall retardation. All the stops produced even marking from all wheels, without any wheels locking, and Tapley meter readings were consistent at 73 to 75 per cent. Using the handbrake alone from about 20 m.p.h. produced Tapley readings between 36 and 39 per cent.

There was no apparent falling off in efficiency during a series of measured stops made in fairly quick succession—in fact, the final one gave the best distance recorded of 44 ft. But the subsequent harsher test for fade, carried out as usual on Titsey Hill, heated the drums and linings sufficiently to cause a falling off to 40 per cent in the Tapley reading obtained in an emergency application from about 30 m.p.h. Even so, the vehicle was brought to rest in a reasonable distance while still on the gradient and, without shielding bodywork, recovery to the normal 75 per cent standard was found to be complete after running about a mile at normal speed. Taking advantage of the optional Ashanco exhaust brake offered would be a good insurance against overheated brakes on vehicles intended for fast touring or for use at the maximum weight in hilly districts and would probably save on lining renewals.

Fuel Consumption

Three separate fuel consumption checks carried out during the run gave indications of what the export Reliance can be expected to do in various types of service. Over our standard 15-mile out-and-back route on A25 between Limpsfield Common and Riverhead in continuous running a consumption of 16.3 m.p.g. at an average speed of 28 m.p.h. was recorded. This is by no means a flat open-road route, being winding and rather undulating and embracing the villages of Westerham, Brasted, Sundridge and Bessels Green, and the result obtained is about what we would expect a bus on limited-stop interurban service to achieve. Operated as a coach without stops and at a rather

lower weight, substantially better figures should be obtainable.

A second check made over a five-mile stretch of rather undulating country road, making four stops in each mile and idling for from five to 10 seconds at each stop, showed a consumption of 10 m.p.g. Brisk acceleration to about 30 m.p.h. from each stop meant that the high top gear was seldom used. In this type of service at the maximum weight there is no doubt that a rather lower axle ratio would be an advantage and would also probably give a rather better fuel consumption. The third check was of overall consumption for a total run of 98 miles, which included about 35 miles in London suburban traffic as well as many stops and much hard driving in the various observed sections. The result of 12.56 m.p.g. was better than we have had with some smaller engines pulling a good deal less weight.

The heavy-duty Reliance will undoubtedly prove an attractive vehicle to many operators and not only in overseas countries. The higher-powered engine than is common in this country in single-deckers obviously has no ill effect on fuel consumption in various types of service and shows advantages in performance, while an engine working at all times well within its capacity is generally less demanding on attention and renewals. It also makes the work of driving a good deal less onerous and for that reason alone the export Reliance is certain to become a firm favourite with its crews.

P.W.I. CELEBRATION London Convention

CELEBRATION by the Permanent Way Institution of its 75th anniversary by holding its 1959 convention in London follows the tradition established on the occasions of its incorporation in 1908, its 40th anniversary and its Golden Jubilee. A most comprehensive programme has been arranged commencing on June 6 and concluding on June 11. On the first day in the evening the chairman and members of the London Transport Executive will hold a reception at Porchester Hall at 7.45 p.m. This will be followed by a dance. On the morning of Sunday, June 7, there will be a thanksgiving service at St. Pancras Church at 11 a.m. and in the afternoon there will be four coach tours to Albury Park and the North Downs, Luton Hoo, London Airport, and of London.

Visits arranged for June 8 include all-day events to the docks at London and Tilbury and to the Southern Region Kent Coast Electrification Scheme and half-day visits to the Ford works at Dagenham, the Houses of Parliament, London Transport Lillie Bridge Depot, and the Post Office Railway. The annual summer general meeting on the morning of June 9 at the Institution of Civil Engineers will be followed by a paper, "Wheels and Rails," by Mr. T. M. Herbert, director of research, British Railways. In the afternoon there will be a reception at Stationers' Hall and in the evening the annual summer dinner will be held at the Connaught Rooms at 7 for 7.30 p.m. when the principal guest will be Sir Brian Robertson, chairman of the British Transport Commission.

The last two days will comprise visits. On June 10 these are to Henry Williams, Limited, Rickmansworth (morning), Eastern Region electrification and associated works on the Great Eastern Line (all-day), cruise through the Port of London (afternoon), and night maintenance work on London Transport railways (all-night). The programme for June 11 includes a morning visit to Lillie Bridge Depot, a morning cruise on the Regents Canal, an afternoon visit to London Airport, and all-day excursion to Bourne End and Windsor.

G. N. WIDENING

(Continued from page 10)

between New Barnet North signalbox and Potters Bar. The former Greenwood box which previously controlled the converging point from four tracks to two, north of New Barnet, has been abolished. Between New Barnet and the north portal of Potters Bar tunnel, which has constituted the resignalling under the recently completed works, 19 new signals are of the searchlight type designed to conform to the general pattern of colour-light resignalling of the Great Northern main line.

A new signal relay room has been provided adjoining New Barnet North box to house additional equipment and train describer equipment is to be installed between the New Barnet North and Potters Bar boxes. Completion of the widening work and elimination of Greenwood box have meant a new section in the diagram and new faceplates on the console at the Potters Bar signalbox. An interesting feature in the cable routes is the method used to support signalling and telecommunications cables through the new tunnels. They are carried on glass-fibre cable hangers attached to the tunnel wall by means of an adhesive. The signalling work was carried out by Metropolitan-Vickers-G.R.S., Limited, as main contractor under the supervision of Mr. R. A. Green, signal engineer, Eastern Region. The electrical work was carried out under the direction of Mr. K. J. Cook, chief mechanical and electrical engineer, Eastern Region.

R.H.A. DINNER

(Continued from page 9)

vestment, finance and trade of the private sector of industry."

"Now for the record let us say to one another one or two quite simple things," said Lord Hailsham. "We are against the nationalisation of the road haulage industry, because it is morally wrong. It is wrong to take away a man's business which he has built up or bought, whether or not compensation may be paid. Of course, an overriding national necessity may arise which justifies the supersession of private rights. But when it is done just for the sake of doing it, which is what is proposed here, it is morally wrong. It is as wrong for the state to steal from the individual as for the individual to steal from the state, and compensation does not make stealing right."

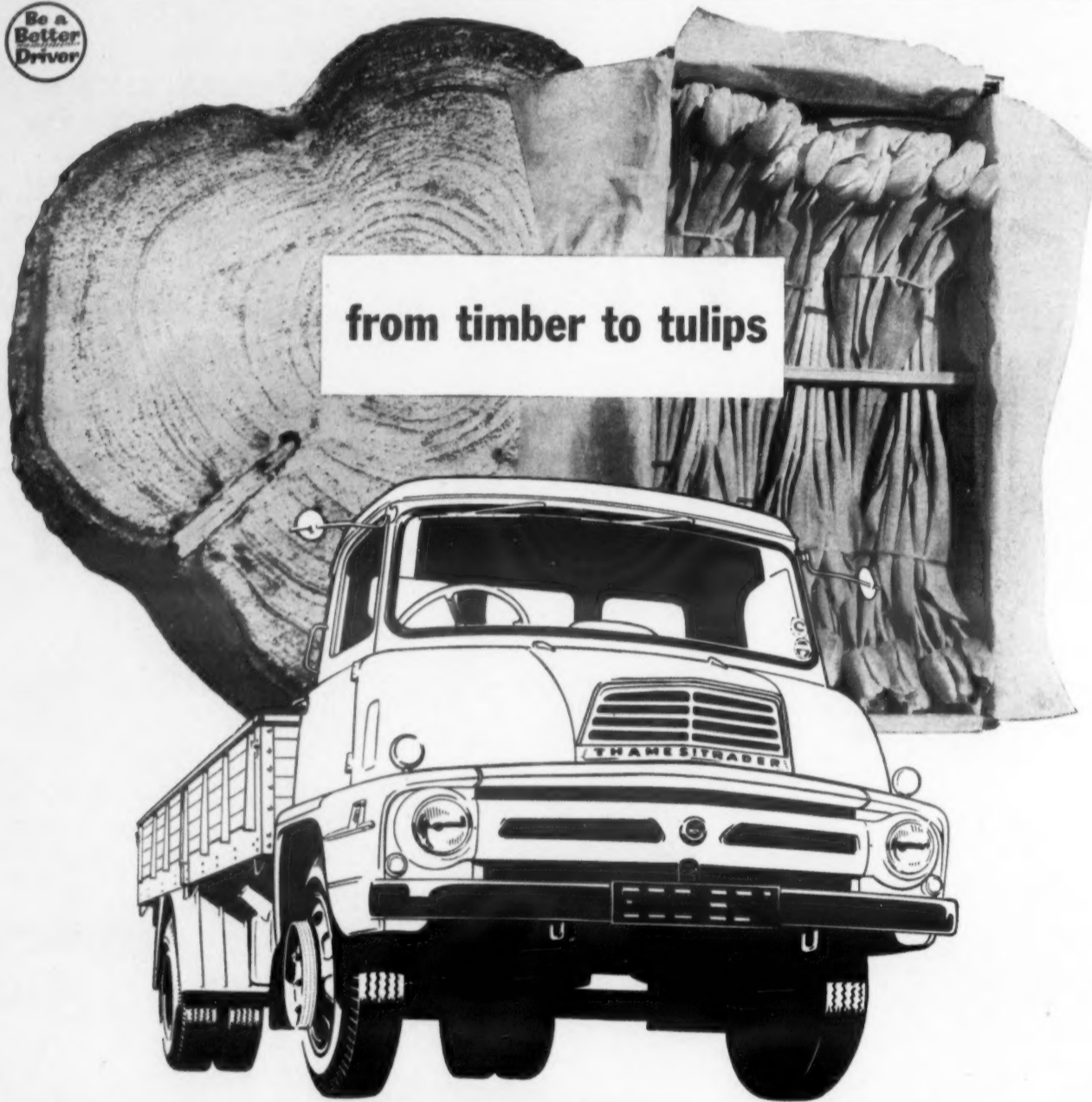
"We are against it because it is inefficient. We do not believe that a single nationalised industry under any government has justified the rosy hopes painted in 1945. We think that road haulage with its intensely individual basis, and its characteristic requirement of personal service is probably as little suitable for nationalisation as any. We are against it because the people do not want it. I think it is about seven people out of eight who are opposed to any further extension of nationalisation."

The toast "The Guests" was proposed by Mr. H. H. Crow, a national vice-chairman, and responded to by Mr. W. H. McFadzean, president of the F.B.I., and Mr. Robert McDermott, a radio and television personality.



A good lock gives the 17 ft. 6 in. w.b. Reliance a turning circle (wheeltrack) of 67 ft. and excellent manoeuvrability for a 32-ft. long chassis

low speeds on level road. Performance on our hill sections around Caterham was also favourable. Although the brochure performance at this weight with the 4.7 to 1 axle, which assumes 85 per cent gear efficiency and 45 lb.-ton rolling resistance, gives a maximum gradient ability in first gear of about 1 in 6, in fact the test chassis had power to spare in restarting in first gear on a 1 in 5 gradient and was actually started from rest in second gear on a 1 in 6½ gradient, with some slipping of the clutch to keep engine speed up in the early stages.



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LUXURY CRUISE BY BRITISH WATERWAYS

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EQUIPMENT OF "WATER WANDERER"

LUXURY cruises are to be operated this summer by British Waterways between Nottingham and Boston via the Trent and the ancient Roman Fossdyke. As distinct from the well-established Oxford-Birmingham cruises by *Water Rambler*, those provided for the new venture are in a craft with cabin accommodation for 16, who will sleep aboard although breakfast and dinner is arranged in hotels. There is also a coach excursion provided, from Newark to Southwell. The vessel for the new facility is *Water Wanderer*, which was launched at Newark on April 24.

From June 5

She will start her first five-day cruise from Nottingham, on the River Trent, on June 5, calling

at Newark, Lincoln and Woodhall Spa on the cruise to Boston via the Fossdyke and Witham Navigations. Night accommodation for 16 passengers, in luxuriously fitted single and double sleeping cabins, is available on *Water Wanderer*, which has also a large lounge-dining saloon and a spacious sun-deck for use by day. All accommodation below deck is

Comfortable Accommodation

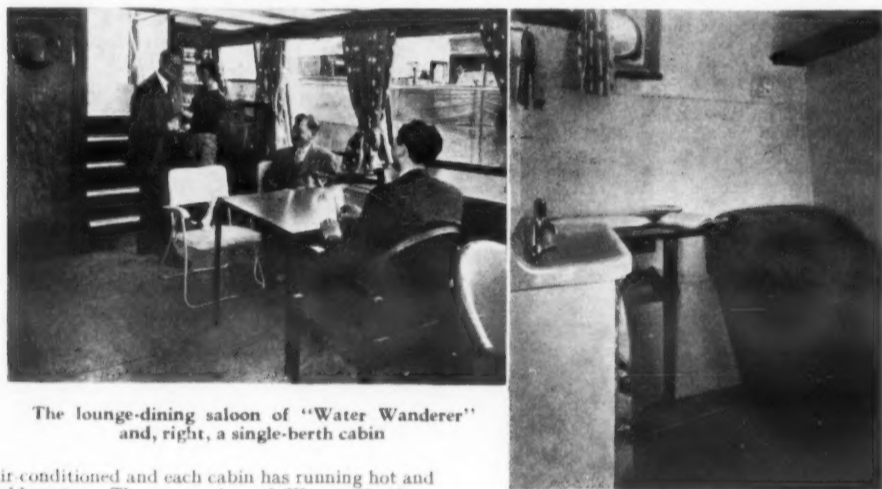
Sleeping accommodation is provided for 16 passengers in seven double-berth and two single berth cabins, each cabin being equipped with wardrobes, drawers and wash basins with hot and cold water supply. An oil-fired Perkins hot-water boiler of 50,000 B.Th.U. capacity, together with a 30 gal. hot water tank, is fitted in the engine room, the



"Water Wanderer," which British Waterways is using for cruises between Nottingham and Boston, passing Newark Castle

main hot water supply pipe passing through the top sections of the aft bulkhead along the main passageway, with branches to each cabin, galley, shower and toilet compartments. Three underwater Simpson-Lawrence w.c.'s are provided, two in the passenger accommodation and one on the after-deck for the crew. A washbasin is also provided in

each of the passenger toilets. A shower bath is provided and there is also a footbath.



The lounge-dining saloon of "Water Wanderer" and, right, a single-berth cabin

air conditioned and each cabin has running hot and cold water. The conversion of *Water Wanderer* was carried out by British Waterways at its Newark repair yard.

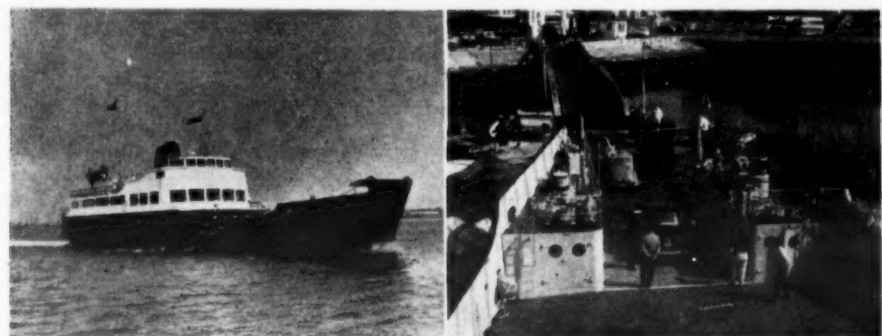
She is 74 ft. 6 in. in length between perpendiculars; the depth moulded is 5 ft. 6 in.; the operating draught 3 ft. 6 in. and the beam 14 ft. 6 in. The hull of the vessel is built of steel of $\frac{1}{2}$ in. thickness with angle frames spaced 17 in. apart. The hull is divided into three main compartments by two watertight bulkheads, one forward separating the forward cabin from the accommodation; and one aft between the engine-room bulkhead and the accommodation. In addition to being watertight this is fitted with a $1\frac{1}{2}$ -in. Turners asbestos covering to meet Ministry of Transport requirements for fire precautions. The hull was originally a cargo-carrying vessel of 80 ft. in length, later shortened to 74 ft. 6 in. for operation on the Fossdyke and Witham Navigations, the stern being altered to give adequate protection to the screw propeller.

The original propelling machinery was a Lister 30-h.p. three-cylinder diesel engine complete with reverse and reduction gear. To give additional power for use in strong currents a 46.5 h.p. Lister engine of the same dimensions, but with higher

compression ratio, has been substituted. Remote controls are incorporated. The generating set consists of a Lister 34-kW air-cooled diesel engine coupled to a 24-volt generator. A main switch-board is fitted in the engine-room, the electric wiring being carried out in copper-sheathed cable and led in a trunk to the cabins, galley, etc.

A spacious saloon fitted forward of the sleeping accommodation is equipped with five tables and comfortable chairs for all passengers. The equipment also includes a small cocktail cabinet and a wireless set. The roomy promenade deck, fitted with hand rails and safety screens on each side, is situated immediately above the sleeping accommodation. A 12-in. dia. G.E.C. power-driven air fan, fitted on the promenade deck, with links to the different cabins, provides specially for ventilation. Louvres are also fitted at the bottoms of the cabin doors. Special "kick-out" door panels are fitted in each of the cabin doors as a safety precaution.

The galley is fitted on the starboard side immediately aft of the dining saloon. It has a gas cooker and gas refrigerator and a sink unit in its centre. A serving hatch, with folding table, is fitted between the saloon and the galley. Accommodation for the crew is provided in two cabins, one on the port side immediately opposite the galley, and one forward in the fore peak of the vessel.



The Red Funnel Steamers' dual-purpose passenger and vehicle ferry "Carisbrooke Castle" (built by John I. Thornycroft and described in our February 7 issue) is now in daily service between Southampton and Cowes, I.O.W. Her articulated bow ramp is seen (right) in operation at Royal Pier, Southampton



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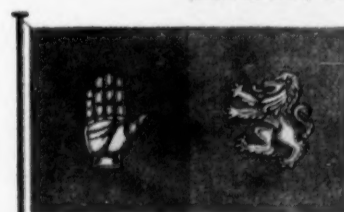
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LETTERS TO THE EDITOR

Timetable Clarity

The Editor is always glad to receive letters from readers on subjects germane to the transport industry, but these should be written as concisely as possible. The opinions expressed therein must not, however, be regarded as having editorial endorsement. Where correspondents desire to use a nom-de-plume it is essential that the Editor should be informed of the name and full address of the writer as indication of good faith.

SIR,—As a schoolmaster I entirely agree with Mr. Behrend's suggestion in your issue of April 18 that timetable reading should be taught in schools. By a strange coincidence I had just been answering questions from some of our sixth form on how to read timetables when I bought the issue of MODERN TRANSPORT containing Mr. Behrend's letter! However, I strongly suspect that timetable illiteracy among schoolteachers might make it difficult to implement the suggestion.

My own experience suggests that the ability of railway staff themselves to read timetables often leaves much to be desired. But the major issue raised by Mr. Veale's letter in your issue of May 2 is not, I think, timetable clarity, though this enters into his problem, but the difficulties raised by alteration pamphlets. In this respect the issue of a booklet timetable with pages of the same size as those of the main timetable as was recently done by Eastern Region for its alterations on the Ipswich main line and branches on January 5, seems to be the most sensible plan where major changes are involved.

What Not to Do

A good example of how not to do it is afforded by the L.M.R. alteration pamphlet—or should I say book?—in which the complete Euston—Crewe timetable is given in revised form on pages so small that three are needed to cover the service and one has to trace trains over the page. It is clearly desirable for railway staff to alter their main timetables, or at least those they most often consult; as alteration pamphlets appear, or else to paste in the revised service. In any case the alteration pamphlet should use table numbers which the L.M.R. does not do.

With regard to the clarity of British Railways timetables, I am certain that there has been considerable improvement during the period of nearly 30 years during which I have been interested in them. This is particularly true in respect of the provision of more adequate information about through working of trains, either by the use of TC notes or by showing connectional trains in a separate column (e.g. at Beccles or Thorpe-le-Soken). In several instances, too, the layout of the tables has been revised to accord with the layout of the train service, so as to show, for example, Nottingham—Workshop or Peterborough—Grimsby in one table; the latest Eastern Region issue, too, shows Liverpool Street—Kings Lynn in one table to accord with the reorientation of the service on the Cambridge line. This makes all the more peculiar the disinclination of the London Midland Region to show Birmingham—Rugeley in one table.

In conclusion I may add that in general British Railways have been disposed to consider suggestions concerning improvements in timetable layout and several of those referred to above have been made at my suggestion.—Yours faithfully,

C. G. V. TAYLOR.

The Grammar School,
Thetford, Norfolk.

Towards a Tramway Museum

SIR,—The reference in your issue of May 2 to "the Tramway Museum Society's line at Ambergate, Derbyshire" is flattering, but, I regret, somewhat premature; we signed the lease for this stretch of virgin land only a few days ago. First we have to raise sufficient money to build a depot, then construct the tramway, so that it may be 10 years or so before any tramcars can operate there. Nevertheless, any gifts of rails, overhead gear, poles, substation equipment or building materials will be very welcome, and will help to bring that day nearer.

In the meantime, we can offer outdoor storage to any local groups willing to preserve particular tramway vehicles and pay for their transport, fencing and sheeting. We must clearly devote our own limited income to construction, otherwise there will be no protection for the vehicles; in the circumstances, the vehicles themselves can best be acquired by local groups, for example, some London tramway students could start a fund to preserve a Feltham car, and perhaps those in Liverpool could raise the money to acquire an ex-Liverpool bogie car from Glasgow, as recently suggested in your columns.—Yours faithfully,

G. B. CLAYDON,

Hon. Secretary,

The Tramway Museum Society.

1 Griffin Road,
Erdington,
Birmingham, 23.

CLASSIFIED ADVERTISEMENTS

RATES.—The minimum charge for classified advertisements is 7s. for 14 words or less, and 6d. for each additional word. The name and address of the advertiser is charged at the same rate. If a box number is used 2s. extra is charged to cover our name and address and postage. If set in paragraph form each paragraph is estimated separately. Official Notices and semi-display in the classified columns are charged at the rate of 40s. per single column inch. **ACCEPTANCE.**—Advertisements can be accepted up to 2.30 p.m. on Monday to ensure insertion in the current week's issue. MODERN TRANSPORT is on Sale every Friday.

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A.E.C. Matador 7.7-litre Diesel Tippers (4) in working condition. Inspection and offers to: Barrow Quarries, Limited, P.O. Box No. 17, Barrow-in-Furness.

SOCIAL AND PERSONAL

B.T.C. Appointment

THE British Transport Commission has appointed Mr. G. W. Quick Smith, LL.B., F.C.I.S., M.Inst.T., to be adviser (special projects) on the general staff of the Commission. Mr. Quick Smith will take up his new duties on a date to be agreed and will relinquish his full-time membership on the board of management of British Road Services which he has held since October, 1953. He had previously been secretary and legal adviser to the Road Haulage Executive since its inception in 1948.

Mr. E. Davis has been appointed marine superintendent of the Marconi International Marine Communication Co., Limited.

The spring meeting of the Thornycroft Society was held at Dagenham on May 15, when approximately 30 members were the guests of the Ford Motor Co., Limited.

Sir John Elliot has been elected chairman from July 1 of Willing and Co., Limited, parent company of the Willing group of concerns engaged in industrial research, marketing and advertising of all kinds. The group has been for many years a prominent user of outdoor advertising on British Railways and the Underground.

Mr. J. Fairclough, who has been appointed district operating superintendent, Crewe, London Midland Region, B.R., commenced his railway career in 1920 with the former Lancashire and Yorkshire Railway in the motive power department at Bolton. He was subsequently in charge of the motive power department at Greenore before being transferred to the operating department in 1934 as assistant district controller, Warrington. Mr. Fairclough later held positions at Heaton Norris, Manchester and Birmingham, and in June, 1955, was promoted to assistant district operating superintendent at Liverpool Lime Street, the position he now leaves to take up his present post.



Mr. J. Fairclough

Mr. C. Garstang, chief assistant general manager, Thos. Cook and Son, Limited, has been appointed to the board of International Motorcoach Tours, Limited, and Mr. A. Turner, F.C.I.S., F.A.C.C.A., assistant general manager (administration), has been elected to the boards of Henu, Peron and Stockwell, Limited, and England's and Perrott's, Limited.

Dr. A. J. R. van Rhijn, High Commissioner for the Union of South Africa in the United Kingdom, paid a private visit to the Saltley and Midland works of Metropolitan-Cammell Carriage and Wagon Co., Limited, on May 20. In the course of his visit, accompanied by Mr. W. H. Maass, advisory engineer, South African Railways, he inspected the last of the 349 electric suburban coaches for the Reef services of the S.A.R. Regular deliveries have been effected against this important contract which was completed on time.

On June 14, Wynford Vaughan Thomas, the noted broadcaster, will be setting out from Cardiff for a week's journey over the branch railways of Wales. His destination will be Amlwch. There will be a half-hour broadcast in the Welsh Home Service every night from stopping places along the route. First stop is Merthyr, and subsequent broadcasts will come from Brecon, Llandovery, Lampeter, Aberystwyth, Portmadoc and Bangor. Rhedol, Festiniog, Talyllyn and Snowdon will all be visited and Thomas will be recording interviews with people he meets on his journey. He will be pleased to meet railway enthusiasts along the way.

Mr. H. Bullough, who has been appointed district commercial superintendent, Derby, London Midland Region, B.R., began his railway career on the former Lancashire and Yorkshire Railway at Manchester in 1915. In 1925 Mr. Bullough moved to Euston, occupied positions in the private sidings, development, canvassing and livestock section of the commercial department and became an investigator in the commercial research section in 1936. He became personal clerk to the chief commercial manager in 1942 and two years later was appointed his assistant (commercial research). In 1945 Mr. Bullough went to Leeds as assistant district goods manager and in the following year moved to Stoke-on-Trent as district goods and passenger manager (later re-designated district commercial superintendent). In 1954 he became district commercial superintendent at Leicester, the position he leaves for his present appointment.



Mr. H. Bullough

We record with regret the death, at the age of 70, of Mr. G. A. Davies, senior partner in the firm of Messrs. Davies and Robson, of Victoria, transport accountants and consultants. Mr. G. A. Davies established the business in 1920 with the late Mr. M. C. Robson in Newcastle upon Tyne, having previously been in the commercial department of the North Eastern Railway.

The Minister of Transport, Mr. Harold Watkinson, will lead the United Kingdom delegation at the talks on shipping matters with the United States Government which will begin in Washington on June 8. Delegations from Belgium, Denmark, France, Federal Republic of Germany, Italy, the Netherlands, Norway and Sweden will also be taking part in the talks. The talks will be informal and there will be an exchange of views with the U.S. State Department ranging over a number of matters of international shipping policy which are of concern to governments, such as flag discrimination, the use of subsidies and the growth of tonnage under flags of convenience.

New P.T.A. Chairman

AT the meeting of the council of the Public Transport Association on May 21, Mr. T. Robert Williams retired from the chair of the Association which he has occupied since May, 1957. Mr. A. F. R. Carling was elected chairman and Mr. R. E. Chisnell and Mr. R. J. Ellery were elected vice-chairmen for the ensuing year. Mr. Carling is a member of the executive staff of the British Electric Traction Co., Limited, Mr. Ellery is chairman or director of a number of B.E.T. bus companies, and Mr. Chisnell is a director of R. Chisnell and Sons, Limited, Winchester.

Air Trainers Link, Limited, has appointed as a director Mr. N. Hill, who recently joined the company as head of the sales division.

F. Taylor and Sons (Manchester), Limited, which is now associated with Steel and Co., Limited, Sunderland, announces the appointment of Colonel L. Bullen to the position of managing director.

The man who designed Dublin bus station for Coras Iompair Eireann, Mr. Michael Scott, has received from Mr. O'Kelly, President of the Irish Republic, the gold medal of the Royal Institute of Architects of Ireland for his work.

Mr. T. W. Royle, who has been appointed district operating superintendent, Rugby, London Midland Region, B.R., began his railway career on the former L.M.S.R. as a clerk at Boxmoor in 1935. In 1938 he became a traffic apprentice and on completion of his training in 1940 joined H.M. Forces in the Royal Engineers where he rose to the rank of major. After further railway experience, Mr. Royle became assistant to district operating manager, Rotherham, in 1947, and in the following year assistant to district operating superintendent, Leeds. He was appointed assistant district operating superintendent, Burntisland, Scottish Region, in 1952, moved to a similar appointment at Leicester in 1954 and became district operating superintendent, Birmingham (W), in 1958.



Mr. T. W. Royle

Mr. L. S. Tredgett, B.Sc.(Eng.), has been appointed assistant sales manager, railway signals department, Metropolitan-Vickers Electrical Co., Limited.

The death is announced of Mr. Harry Wells, manager of the Potteries Motor Traction depot at Biddulph. He was aged 55 and was previously with Wells Motor Services, Limited, until its absorption by P.M.T.

Election of Mr. R. G. Grout (chairman and managing director, the General Steam Navigation Co., Limited) as president of the Institute of Transport for the session 1959-60 has already been announced. The following have been elected to serve as vice-presidents: Messrs. A. F. R. Carling (executive, British Electric Traction Co., Limited); H. H. Crow (chairman and managing director, Crow Carrying Co., Limited); Marshal of the R.A.F. Lord Douglas of Kirtleside (chairman, British European Airways); K. W. C. Grand (member, British Transport Commission); General Sir Brian Robertson (chairman, British Transport Commission); and G. F. Sinclair (member of the management board, British Road Services). The hon. treasurer is Mr. F. C. Asgill (vice-chairman, Stephenson Clarke, Limited) and the hon. librarian Major-General Sir Reginald Kerr (general manager, British Waterways).

As previously recorded, Mr. E. A. Talbot, A.M.I.Mech.E., M.I.Loco.E., has been appointed district motive power superintendent, Birmingham New Street, London Midland Region, B.R. Mr. Talbot commenced his career as a privileged apprentice at the Derby works of the former Midland Railway and gained experience at the Nottingham, Lincoln, Rowsley and Peterborough depots. He was appointed a junior assistant to the divisional motive power superintendent, Derby, in 1932 and seven years later he was transferred to Bristol Barrow Road depot as assistant district motive power superintendent. In 1946 he was promoted to be assistant to the divisional motive power superintendent, Hunts Bank, Manchester (headquarters of the Central Division) and was appointed district motive power superintendent, Saltley, in 1947, the position he now leaves for his new appointment.



Mr. E. A. Talbot

The annual meeting of members of the Railway Benevolent Institution will be held at Euston Station, on June 30, at 4 p.m. At this meeting an amendment to bye-law 20 will be offered whereby "the amount of an annuity payable to a railwayman or his widow shall in general, subject to a maximum of £25 (or in the case of a person qualified in the officers' department under the old rules £32 10s. provided he has paid 26 consecutive annual contributions) be fixed at the rate of £1 5s. for each year of qualified membership of the railwayman provided the qualified membership exceeds five years; his widow shall be eligible whether or not the railwayman was awarded an annuity. In the case of a railwayman with less than five years' qualified membership who or whose widow applies for assistance the board may award gratuities at their discretion." It is also proposed to amend bye-law 48 so as to establish a special benevolent fund. For this purpose the board of management shall have discretion to take such sums as it may consider appropriate from donations.

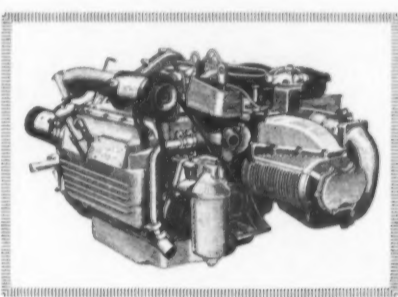
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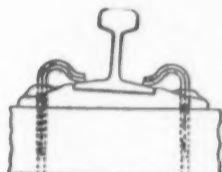
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IMPORTANT CONTRACTS

More Viscounts Ordered

IT has been announced by Vickers-Armstrongs (Aircraft), Limited, that it has sold two more Viscount turboprop air liners—one to Misrair, the Egyptian airline, and the other to the Royal Bank of Canada. The Misrair Viscount is a V739A similar to the last two of the airline's fleet of four Viscounts. It will be delivered in a year's time. The Royal Bank of Canada aircraft—a V793 Viscount—has already been delivered. The total number of Viscounts sold is now 407—comprising 284 V700; 66 V800 and 57 V810 aircraft.

A.E.C. Bridgemasters Ordered

A.E.C., Limited, announces that, following recent successful demonstrations, Leicester Corporation Transport and Southend Corporation Transport have ordered trial batches of A.E.C. Bridgemaster lowbridge double-deckers.

Power Units for Shunters

The British Transport Commission has placed the following orders for 16 power units for diesel-electric shunting locomotives:

English Electric Co., Limited, for 15 spare power units, comprising diesel engine and main generator only, for 350-h.p. diesel-electric shunting locomotives.

General Electric Co., Limited, for one spare power unit, comprising diesel engine and main generator only, for a 350-h.p. diesel-electric shunting locomotive.

Recent North Eastern Region Contracts

The North Eastern Region of British Railways announces that a contract for the erection of a new goods shed, consisting of a steel-framed, part-sheeted building at Hull English Street has been placed with Octavius Atkinson and Sons, Limited, Harrogate. Brightside Heating and Engineering Co., Limited, of Newcastle, has been given a contract for the supply, delivery and erection of a low-pressure hot water installation in mess rooms at Newcastle Forth Banks Goods Depot.

British De-Icing System for U.S. Jet Aircraft

The North American Sabreliner, a small swept-wing jet trainer for which commercial and executive versions are contemplated, will have its wings, leading-edge slats, fin and tailplane leading-edges, and air-conditioning air inlet ducts protected against icing dangers by the Spraymat electrical system of surface heating developed in the United Kingdom by D. Napier and Son, Limited, and manufactured in the United States by the PacAero Engineering Corporation, the sole U.S. licensee.

Supervisory Control Equipment for B.R.

The British Transport Commission has placed an order with Standard Telephones and Cables, Limited, for electric supervisory control equipment, used for remotely controlling and supervising power supplies, needed for the following British Railways' electrification programmes on the 50-cycle a.c. system, in the Eastern Region:

London Liverpool Street to Enfield, Chingford, Hertford East and Bishop's Cleeve.

London Fenchurch Street to Tilbury and Southend. London Liverpool Street to Chelmsford and Southend. (Conversion of the existing d.c. system to a.c. in readiness for the extension of electrification by stages to East Anglia.)

Recent Orders for Commers and Karriers

Recent orders placed with Commer Cars, Limited, include six Karrier Bantam chassis cabs and 12 Karrier Bantam 10 ft. 2 in. wheelbase mineral water trucks for Thomas and Evans, Limited. British Overseas Airways Corporation has also ordered eight Karrier Gamecock chassis cabs with 9 ft. 7 in. wheelbases and fitted with medium diesel engines. British Road Services has placed an order through Rootes, Limited, London, for 13 10-ton Commer tractor units fitted with Rootes two-stroke diesel engines and Scammell coupling gear.

TENDERS INVITED

THE following items are extracted from the Board of Trade Special Register Service of Information. Inquiries should be addressed, quoting reference number where given, to the Export Services Branch, Board of Trade, Lacon House, Theobalds Road, London, W.C.1.

June 3—Formosa.—Central Trust of China for ROUGH ROLLED STEEL WHEEL TYRES. Various types totalling 1,000. Tenders through local representative to Central Trust of China, Purchasing Department, 68 Yen Ping Nan Lu, Taipei, Taiwan. (ESB/12355/59.)

June 4—Formosa.—Central Trust of China for eight forward-control DIESEL BUS CHASSIS, suitable for continuous on and off the road operation in subtropical country. Max. g.v.w. not less than 18,500 lb. Tenders through local representative to Central Trust of China, Purchasing Department, 68 Yen Ping Nan Lu, Taipei, Taiwan. (ESB/12356/59.)

June 7—New Zealand.—Mines Department for 470 cwt. dog-eared chisel-pointed 2½-in. 5/16-in. dogspikes to be packed in 1-cwt. double bags. Tenders to the Supply Manager, Mines Department, P.O. Box 6342, Te Aro, Wellington, New Zealand. (ESB/11824/59.)

June 9—India.—India Supply Mission for heavy-duty ARTICULATED TRACTOR and LOWBED MACHINERY TRAILER. Tenders to Government of India, India Supply Mission, 2538 Massachusetts Avenue, N.W., Washington 8, D.C. (ESB/10411/59/ICA.)

SHIPPING and SHIPBUILDING

Tanker Changes Seen

SPEAKING after the launching at Belfast by Harland and Wolff, Limited, of a second 42,000-ton tanker, the *British Power*, for the B.P. Tanker Co., Limited, on Friday last week, Mr. A. E. C. Drake, a managing director of the British Petroleum Co., Limited, said that the design of tankers had not changed tremendously during the past 30 years, but his company, in looking ahead, was examining every proposal made for improvements that would cut the cost of transporting oil. He was confident that when changes were made, Harland and Wolff would be in the forefront of shipbuilders in tackling anything proposed by the oil industry. British Petroleum was deeply conscious that there was a vast number of craftsmen and employees who were very much dependent on the orders that companies in the oil business were able to place with shipbuilders, he added. Harland and Wolff has now completed, or is completing, 37 tankers for these owners, and a further ten ships are on order at Belfast or Govan from the group.

Quicker Building in Modern Berths

WITH its modernised berths, Swan, Hunter and Wigham Richardson, Limited, could now build ships competitively in time with foreign yards, Mr. E. J. Hunter, chairman of the company, said last week. He was speaking after the launching of the 8,550-ton Palm Line motor cargo vessel *Ibadan Palm*. Mr. Hunter said that this ship, built in a modernised berth, had taken three months less to launch than a previous delivery to the same owners built by the old methods. Moreover, times could be reduced still further.

Cars Imported at Ramsgate

RAMSGATE harbour is developing its trade in cars from West Germany. Ships now arrive roughly every five days and discharge up to 85 cars at each visit. The cars are mostly Volkswagens. While the vessels are discharging the cars from their after holds, the fore part of the ships are at the same time loaded with a consignment of 1,000 tyres, usually Michelin tubeless, exported to Germany for fitting to the Volkswagen cars. Teamwork and harbour organisation enable the vessels to arrive, discharge, load and leave again on the same tide, it is stated.

Second Channel Islands Ship

ON May 25, Mrs. A. B. B. Valentine, wife of the recently-appointed chairman of the London Transport Executive, launched the second of the two twin-screw cargo vessels, which Brooke Marine, Limited, is constructing in its Lowestoft shipyard for the Southern Region of British Railways. The m.v. *Moose* is 288 ft. long overall and is approximately 1,000 gross tons, having a designed speed of 14 knots. The vessel will be propelled by two 900-b.h.p. diesel engines of Sulzer manufacture, placed aft, which were reassembled at the Brooke Marine yard. With *Eik*, her sister ship, the *Moose* will, as already reported, replace the *Haslemere*, *Ringwood* and *Whistable* on the Channel Islands service, and will be based at Southampton.

FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

Rolls-Royce

Consolidated profit of Rolls-Royce, Limited, for the year 1958 was £4,606,980 (£5,370,334), of which taxation takes £2,520,000 (£3,050,000). Ordinary dividend for the year is 20 per cent (same).

Thornycroft South Africa

Transport Equipment (Thornycroft), Limited, has formed a subsidiary company in South Africa, known as Thornycroft South Africa (Pty.), Limited, and situated at 110-112 Booyens Road, Selby, Johannesburg.

Beyer Peacock

Reviewing the forward position, Mr. H. Wilmot, chairman of Beyer, Peacock and Co., Limited, reports that order books are filling up and in the absence of unexpected deterioration it may be not unreasonable to expect for 1960 and the following years some measure of all-round benefit from improving general trade. In the current year the company hopes to consolidate its group organisation and proposes to operate the parent as a holding company. Referring to the formation of Beyer Peacock (Hymek), Limited, to promote the sale of diesel hydro-mechanical locomotives, Mr. Wilmot records that J. Stone and Co. (Deptford), Limited, has joined this grouping. It is hoped that this will add strength to the previous powerful combination. The order book of this new company already runs into some millions of pounds, it is stated. (Results of Beyer, Peacock for 1958 appeared May 16.)

The men

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Production of Trojan chassis, now stepped up to 25 a week, is to be doubled in the near future. A three-quarters rear view of the new 13-passenger rural bus on the 25-cwt. chassis with Perkins P3 engine—the rear window is detachable as an extra emergency exit; right, a 25-cwt. f.c. van with Trojan-built body and a Lambretta 5-cwt. three-wheeler which is also marketed by Trojan

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